User & Developer Survey 2022

Andrew Claster

Methodology

We conducted 1,162 interviews online among Julia users and developers July 7-18, 2021

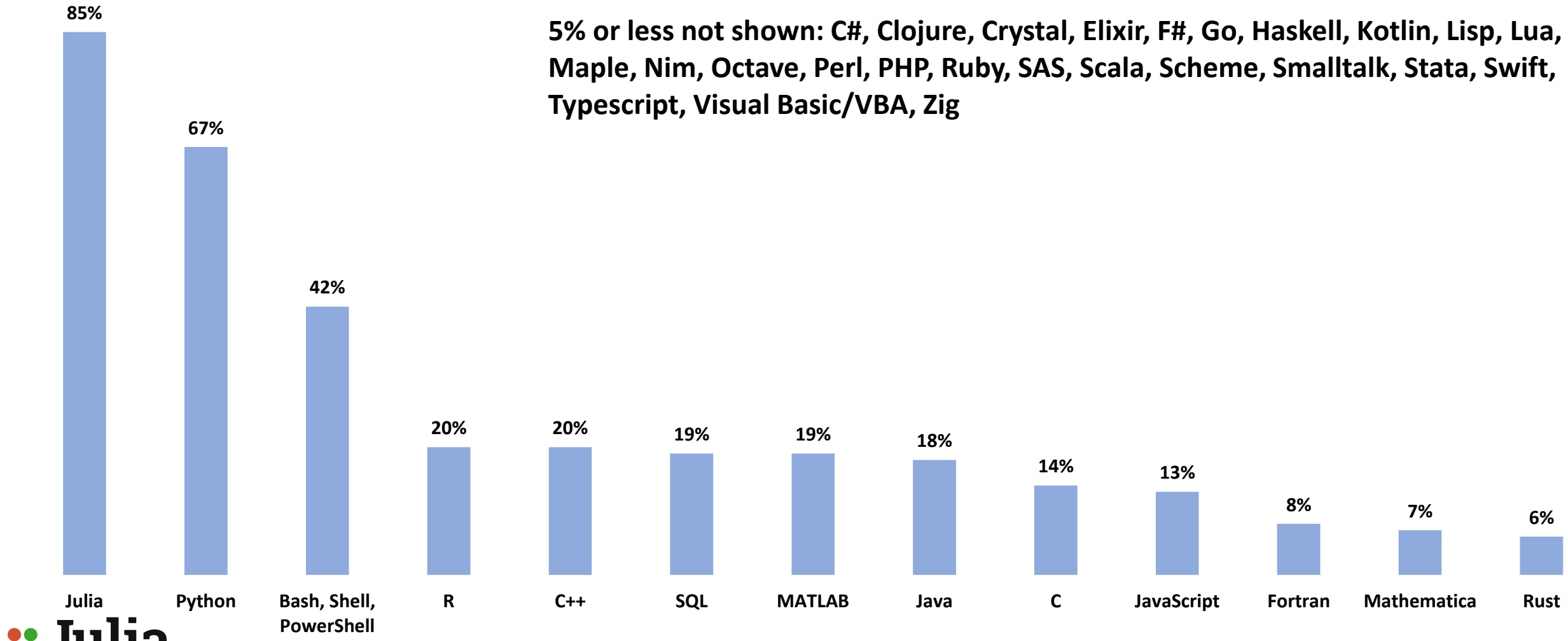
Margin of error is +/- 2.9 percentage points

We recruited respondents online using Slack, Discourse, Forem, Twitter, LinkedIn, email, JuliaLang.org and JuliaComputing.com

The survey was administered in 3 languages: English, Japanese and Spanish

Python (67%) Is the #2 Language Among Julia Users, Followed by Bash, Shell, PowerShell (42%) at #3

Which of the following languages have you used regularly or frequently during the past year?

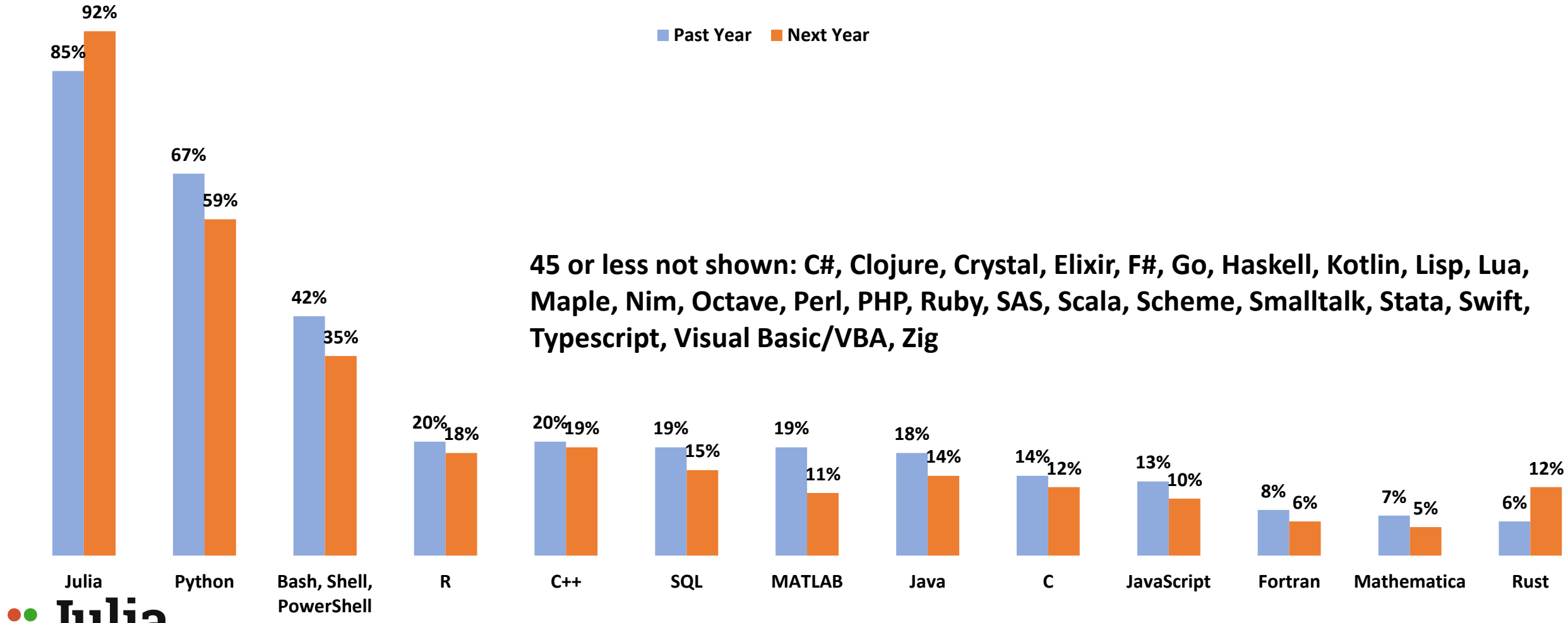


5% or less not shown: C#, Clojure, Crystal, Elixir, F#, Go, Haskell, Kotlin, Lisp, Lua, Maple, Nim, Octave, Perl, PHP, Ruby, SAS, Scala, Scheme, Smalltalk, Stata, Swift, Typescript, Visual Basic/VBA, Zig

Julia computing

Julia Users Plan to Use More Julia and Rust and Less Python and Other Languages

Which of the following languages have you used regularly or frequently during the past year?
Which of the following languages do you plan to use regularly or frequently during the next year?

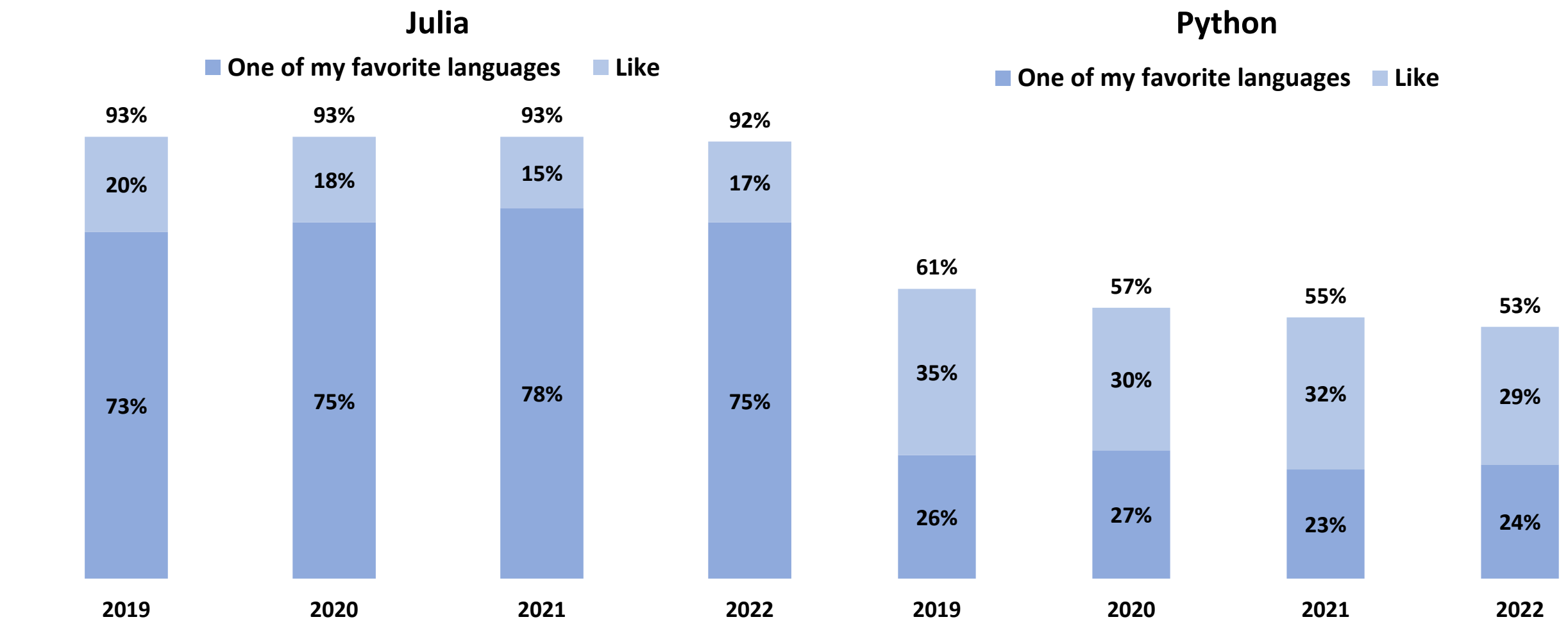


45 or less not shown: C#, Clojure, Crystal, Elixir, F#, Go, Haskell, Kotlin, Lisp, Lua, Maple, Nim, Octave, Perl, PHP, Ruby, SAS, Scala, Scheme, Smalltalk, Stata, Swift, Typescript, Visual Basic/VBA, Zig

Julia computing

75% Say Julia Is 'One of My Favorite Languages'
Python Has Been Declining Among Julia Users Since 2019

How much do you like each of the following languages?

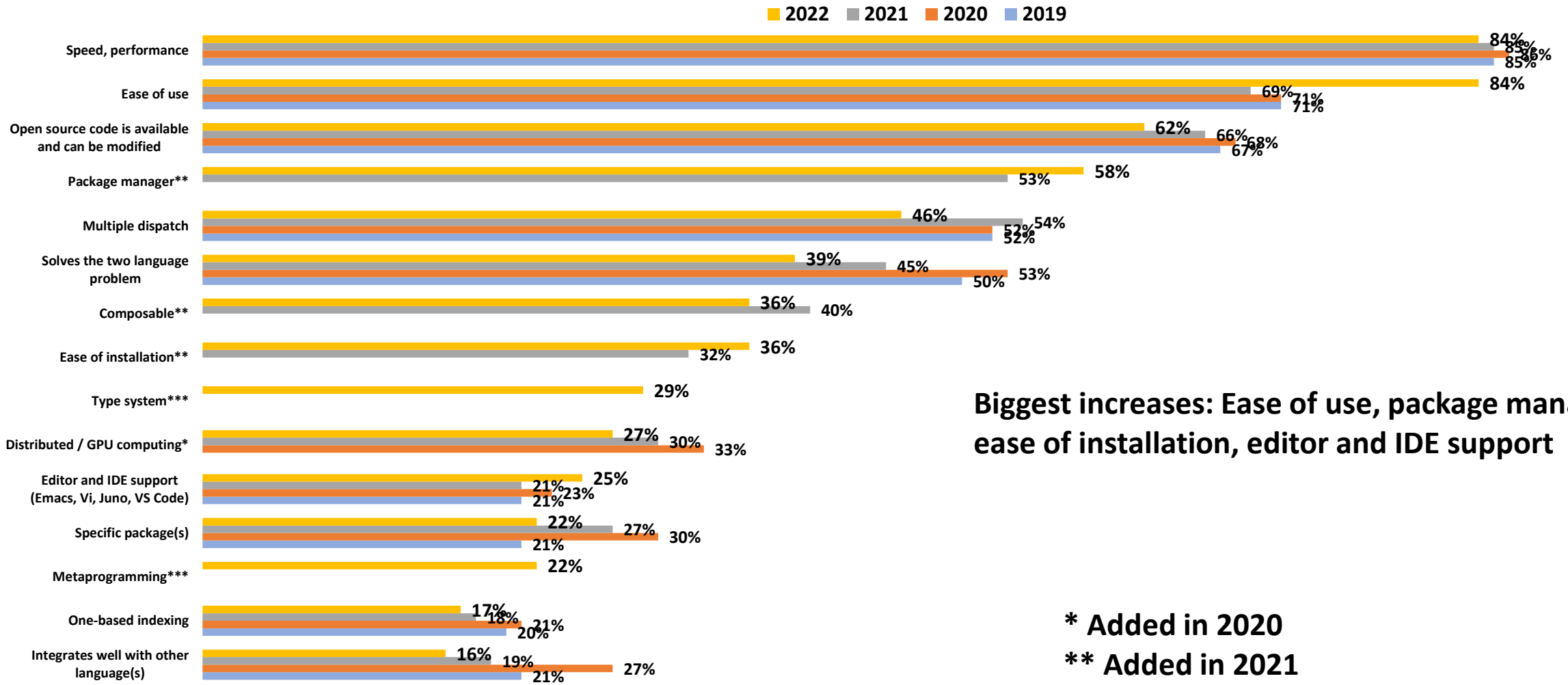


Other languages not shown include C (24% 'one of my favorite languages' + 'like'), Bash/Shell/PowerShell (20% 'one of my favorite languages' + 'like'), R (23% 'one of my favorite languages' + 'like', C++ (19% 'one of my favorite languages' + 'like'), Rust (17% 'one of my favorite languages' + 'like'), MATLAB (16% 'one of my favorite languages' + 'like') and SQL (14% 'one of my favorite languages' + 'like')

Julia computing

The MOST Popular TECHNICAL Features of Julia Are Speed/Performance, Ease of Use, Open Source, Package Manager, Multiple Dispatch, Solves Two Language Problem, Composable

Thinking only about the TECHNICAL aspects or features of Julia, what are the TECHNICAL aspects or features you like MOST about Julia?



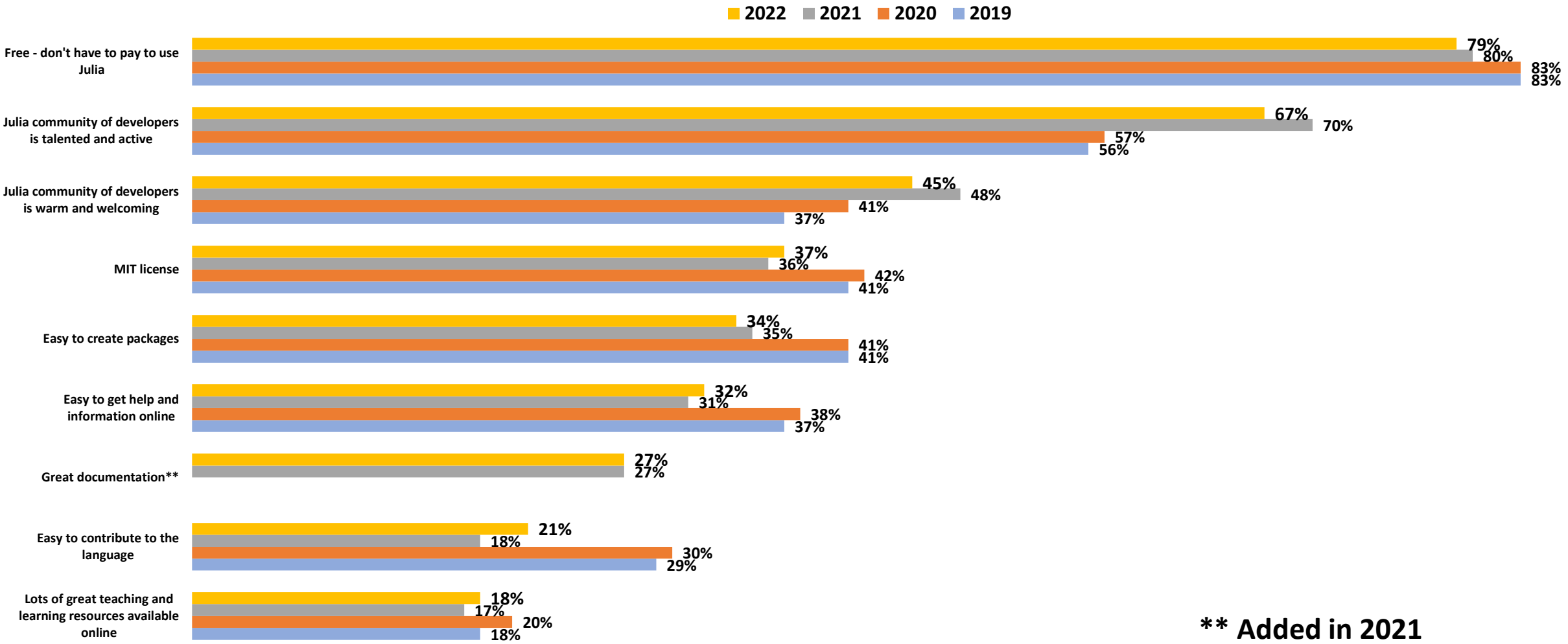
Biggest increases: Ease of use, package manager, ease of installation, editor and IDE support

* Added in 2020
** Added in 2021
*** Added in 2022

Julia computing

The MOST Popular NON-TECHNICAL Features of Julia Are Free (Don't Have to Pay) and the Julia Community

Thinking only about the NON-TECHNICAL aspects or features of Julia, what are the NON-TECHNICAL aspects or features you like MOST about Julia?

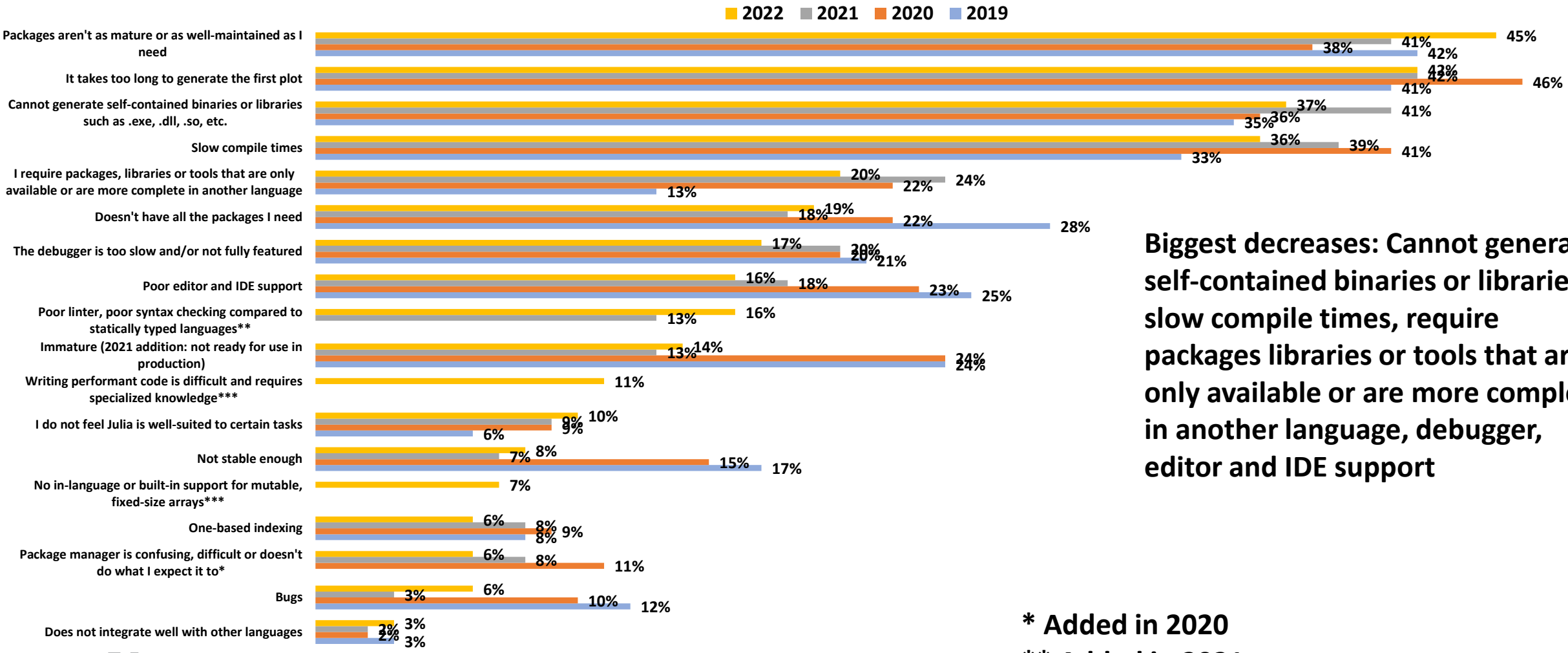


** Added in 2021

Julia computing

The Biggest TECHNICAL PROBLEMS with Julia Are Packages Aren't as Well-Maintained as I Need and Too Long to Generate First Plot

Thinking only about the TECHNICAL aspects or features of Julia, what are the TECHNICAL aspects or features you like LEAST about Julia?



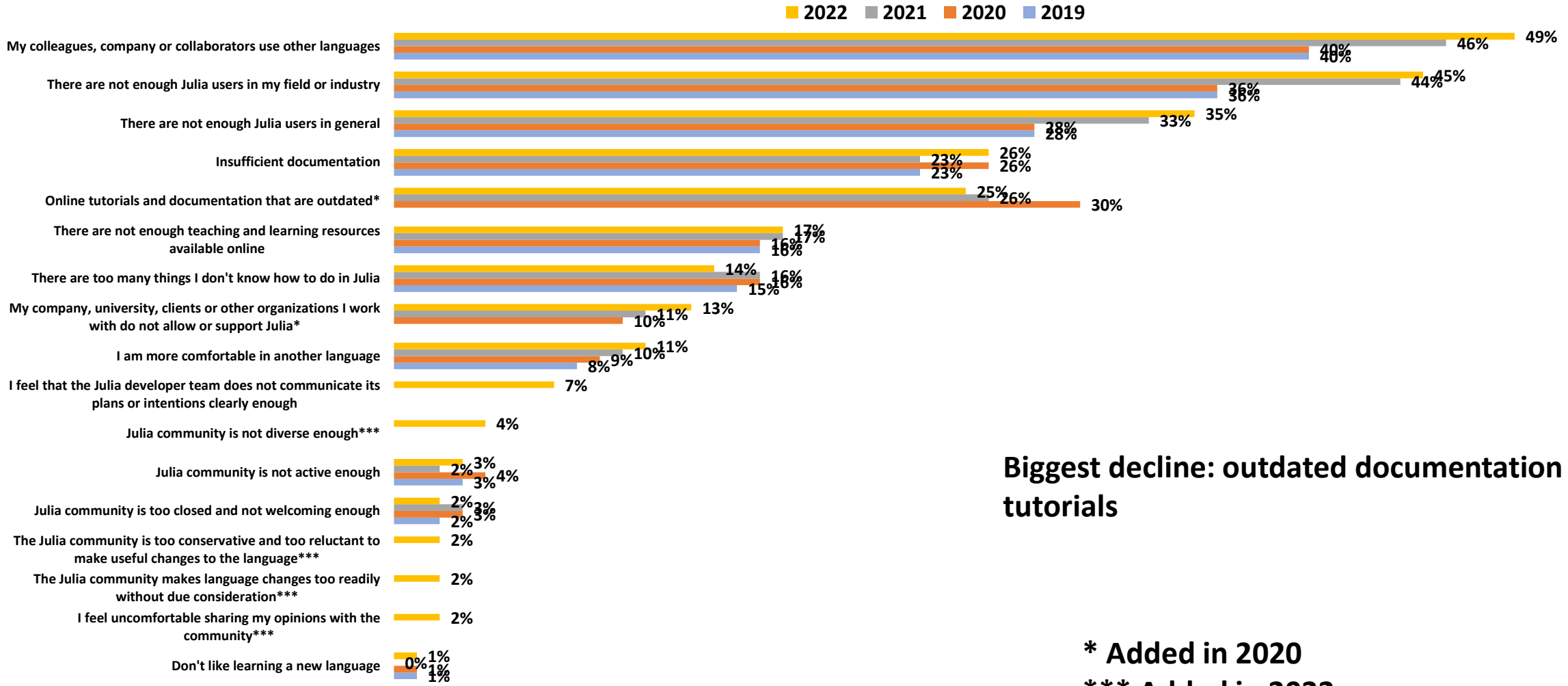
Biggest decreases: Cannot generate self-contained binaries or libraries, slow compile times, require packages libraries or tools that are only available or are more complete in another language, debugger, editor and IDE support

* Added in 2020
** Added in 2021
*** Added in 2022

Julia computing

The Biggest NON-TECHNICAL PROBLEMS with Julia Are Related to Adoption: Too Many Colleagues, Collaborators and Others Use Other Languages

Thinking only about the NON-TECHNICAL aspects or features of Julia, what are the NON-TECHNICAL aspects or features you like LEAST about Julia?



Biggest decline: outdated documentation and tutorials

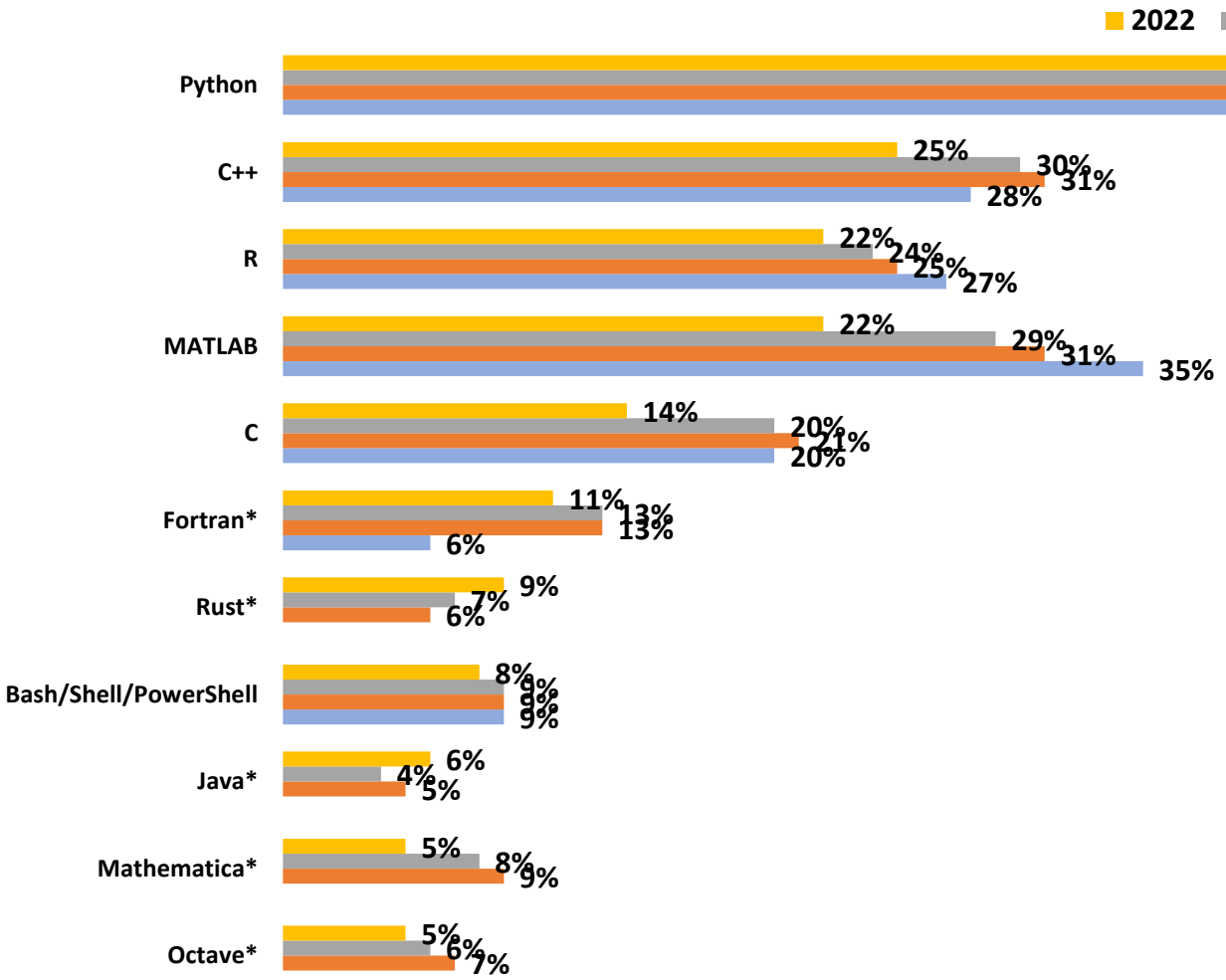
*** Added in 2020**

***** Added in 2022**

Julia computing

Python Is #2 for Julia Users, Followed by C++, R, MATLAB and C

Thinking about the tasks for which you use Julia, if you weren't using Julia for these tasks, what programming language would you be using?

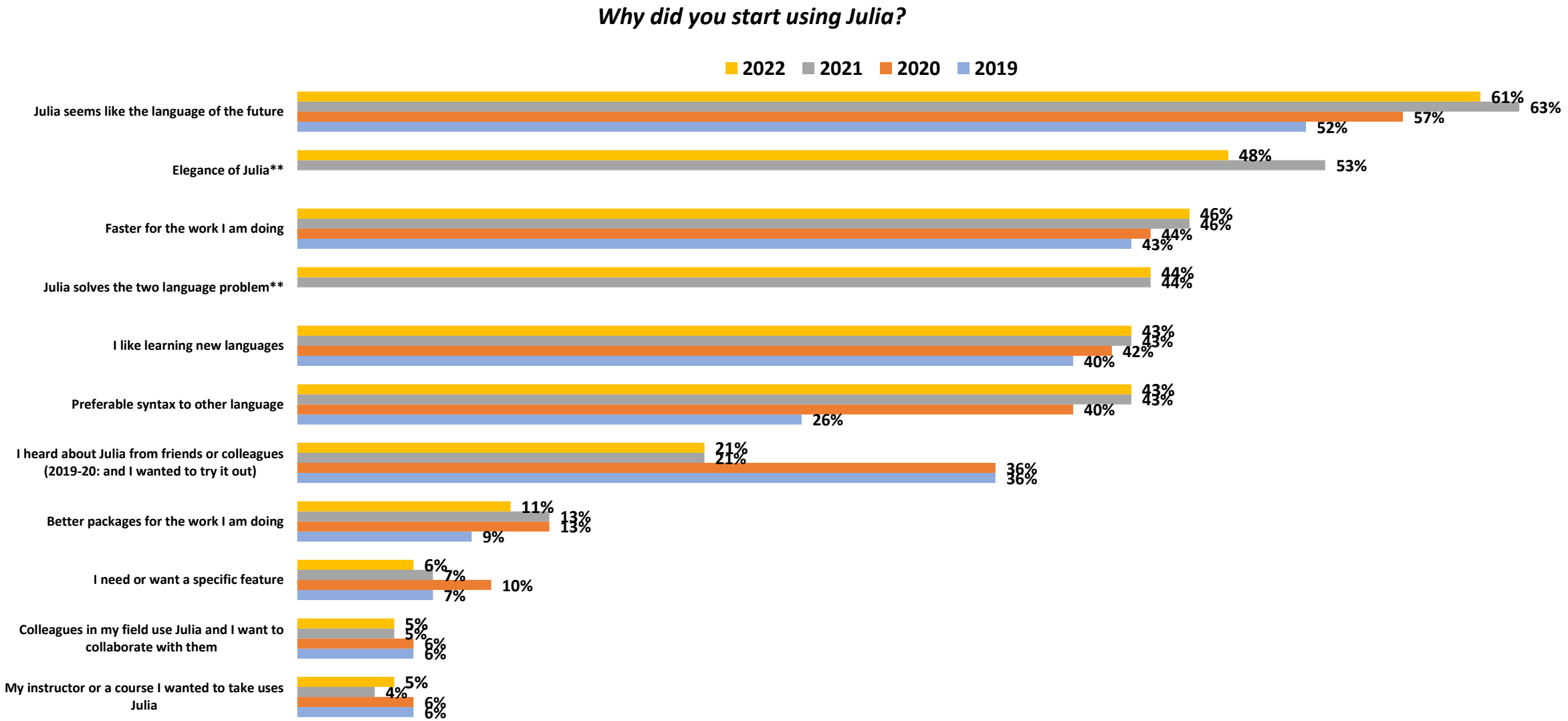


Responses < 5% not shown: Zig, Visual Basic, TypeScript, Swift, Stata, SAS, PHP, Perl, Nim, Lua, Kotlin, F#, Elixir, Crystal, Clojure, Ruby, Maple, Haskell, Scala, Lisp, C#, SQL, JavaScript, Go, Smalltalk

Julia computing

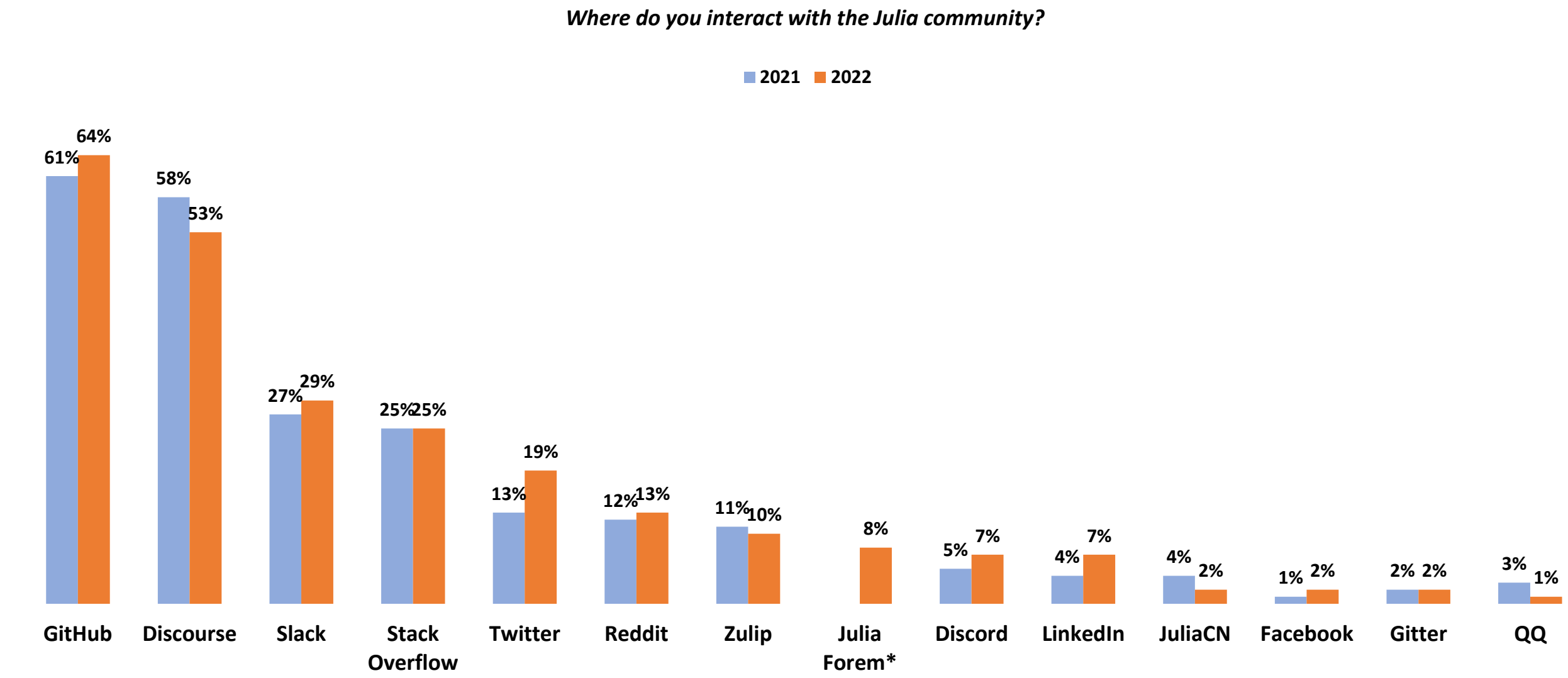
*** Added in 2020**

Reasons for Choosing Julia: Seems Like the Language of the Future, Elegance, Speed, Solves the Two Language Problem, Like Learning New Languages, Preferable Syntax



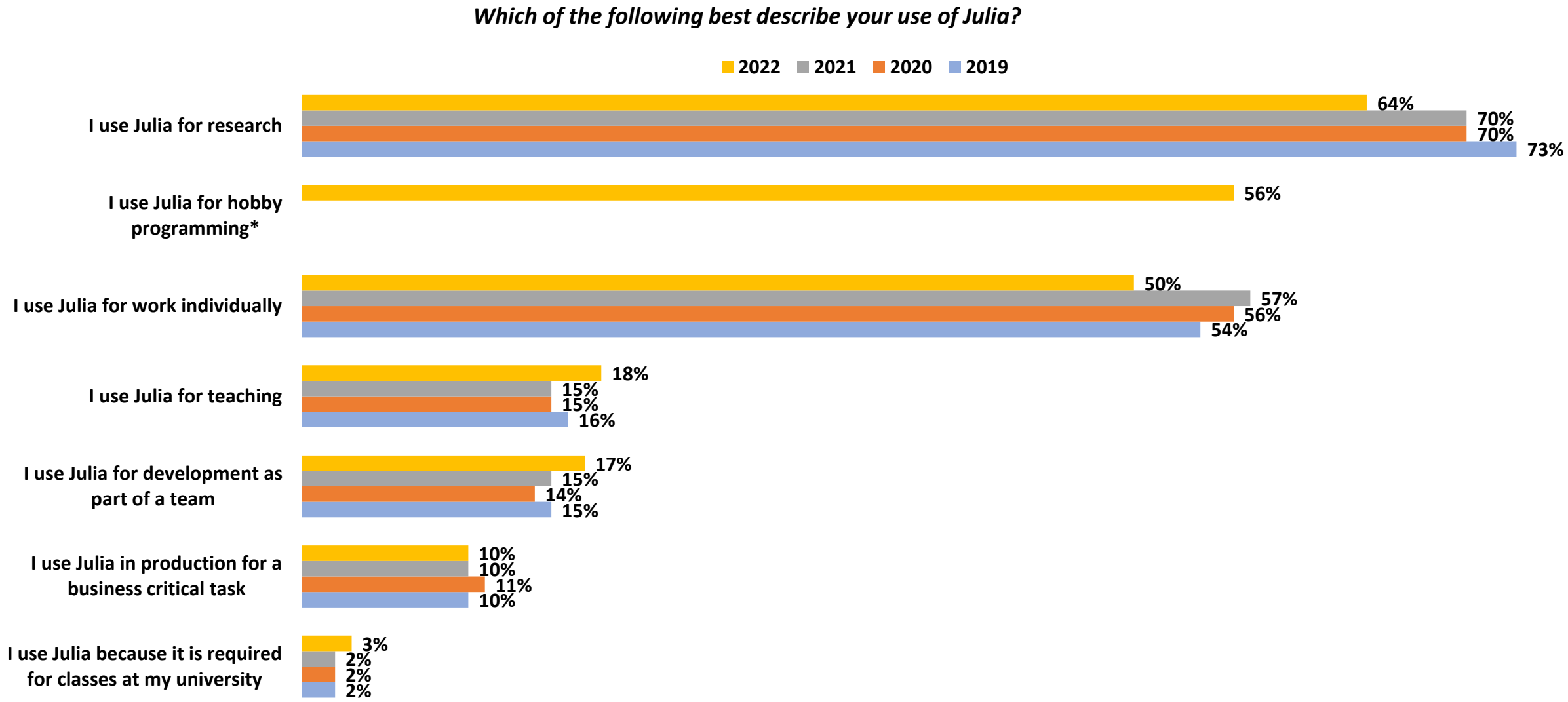
** Added in 2021

Julia Users & Developers Interact on GitHub, Discourse, Slack and Stack Overflow; Twitter, Forem, LinkedIn and Discord Interactions Have Grown



* Added in 2022

Most Use Julia for Research, Hobby Programming and Individual Work

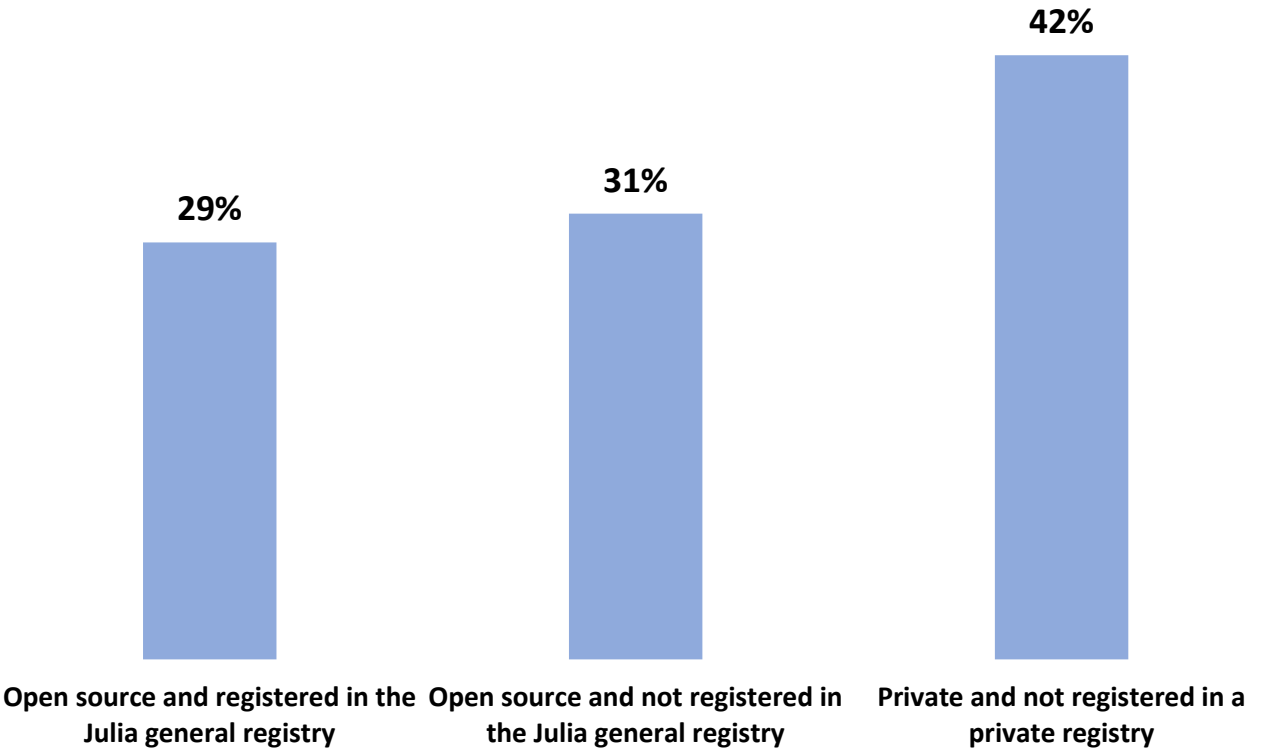


Julia computing

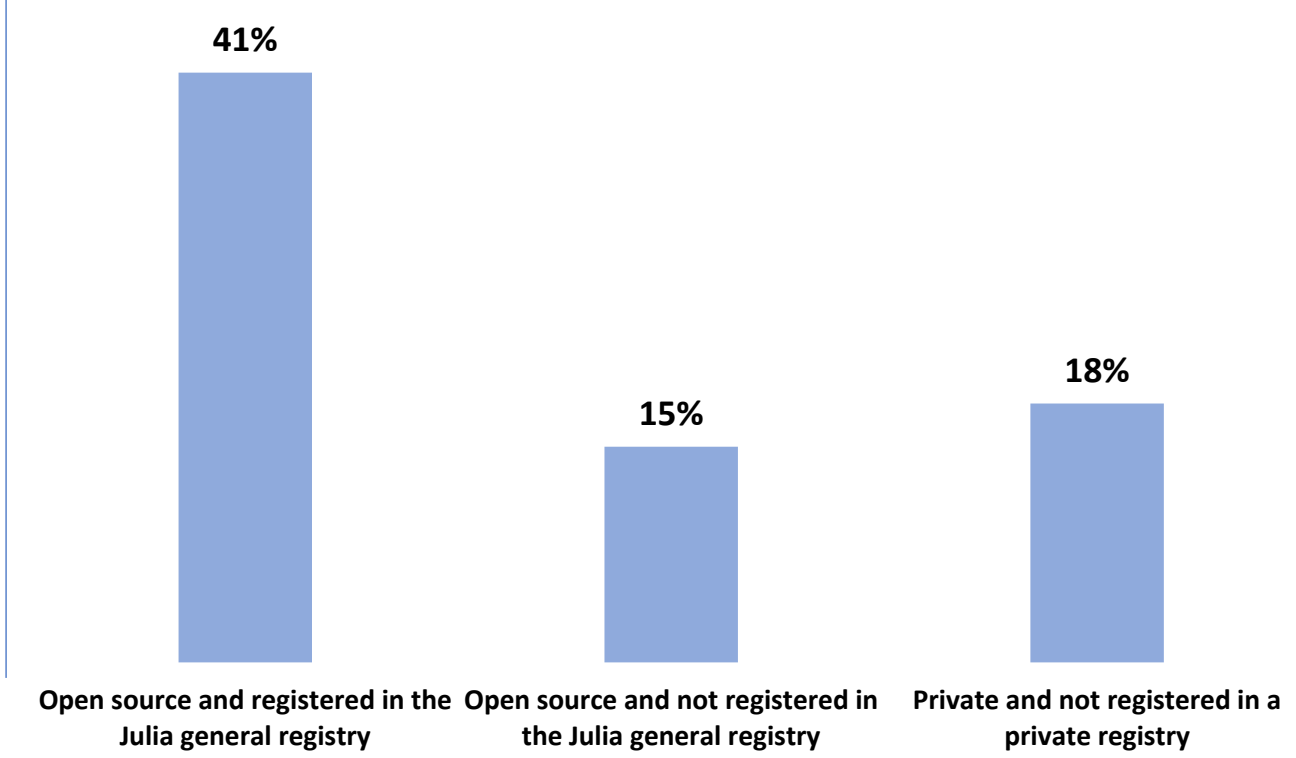
* Added in 2022

Users and Developers Are Most Likely to Create Private Packages and Contribute to Open Source Packages

Which of the following types of Julia packages have you created?

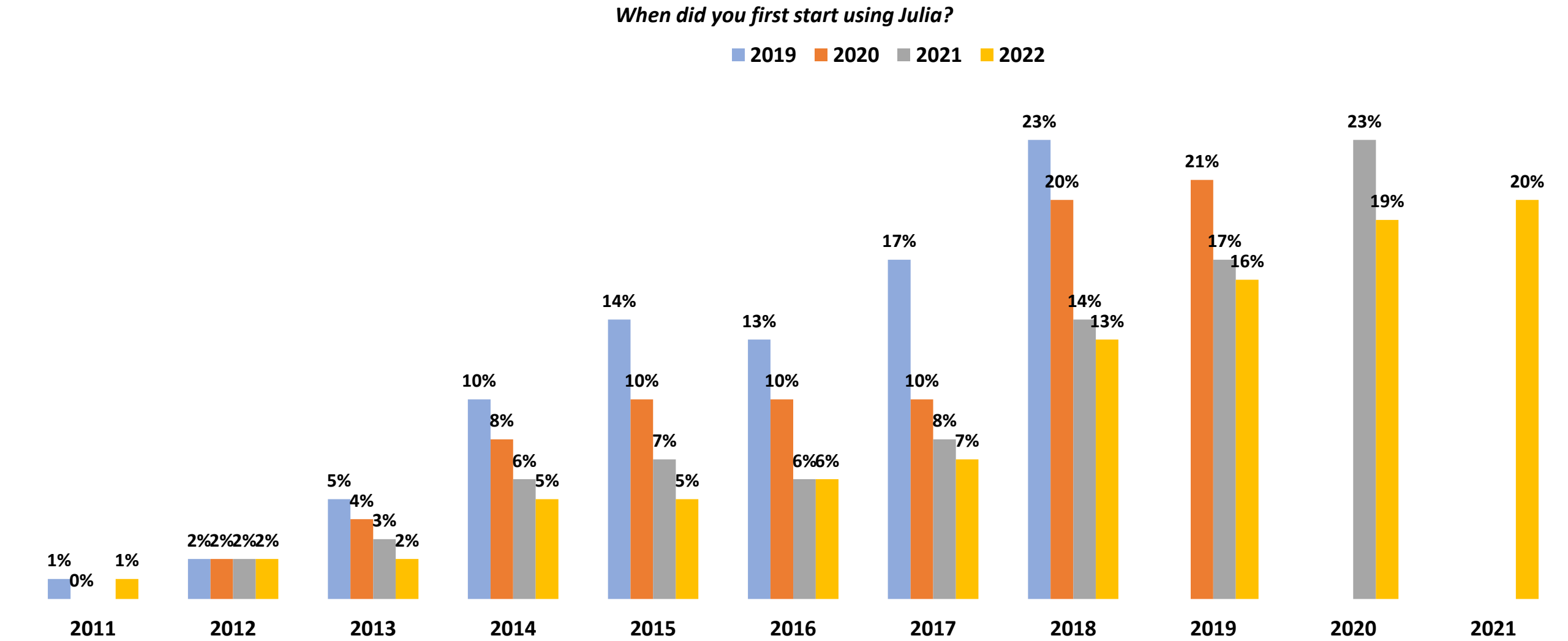


Which of the following types of Julia packages have you contributed to, including documentation or filing issues, but not created?



Julia computing

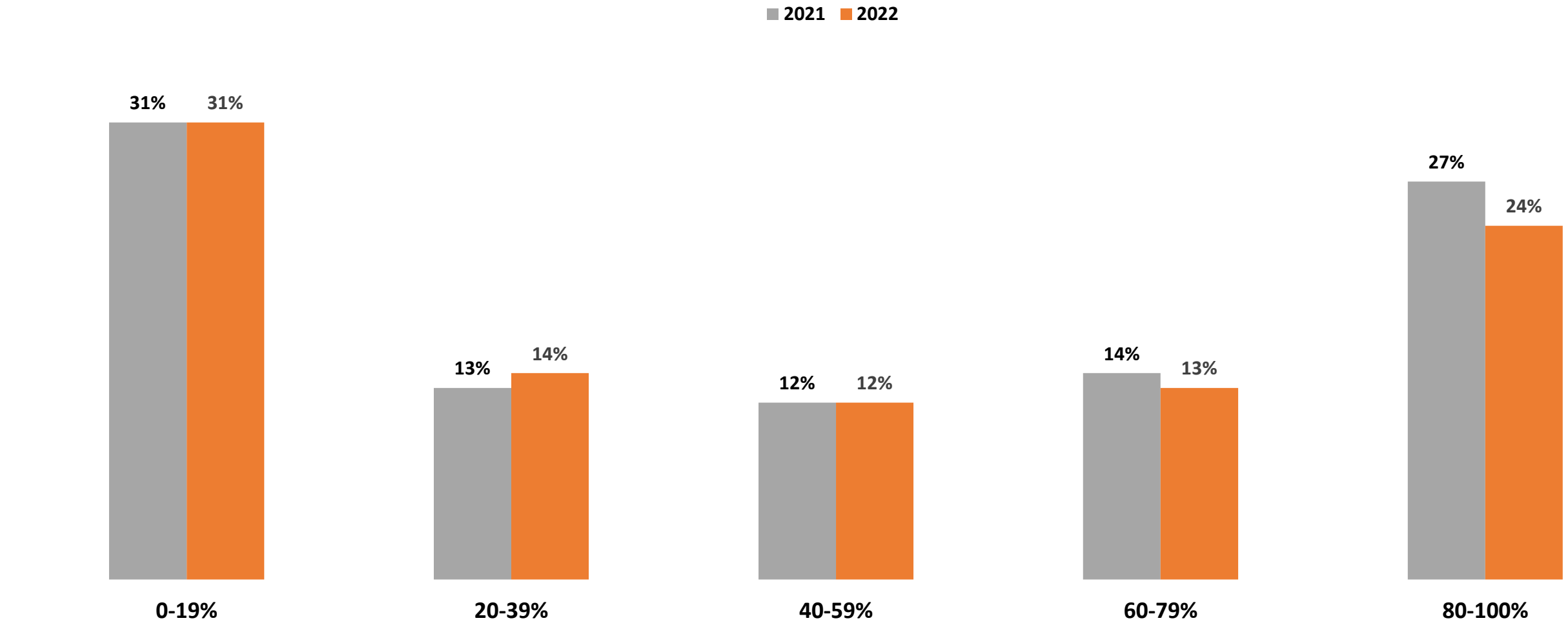
Most Started Using Julia in the Last 4 Years



Julia computing

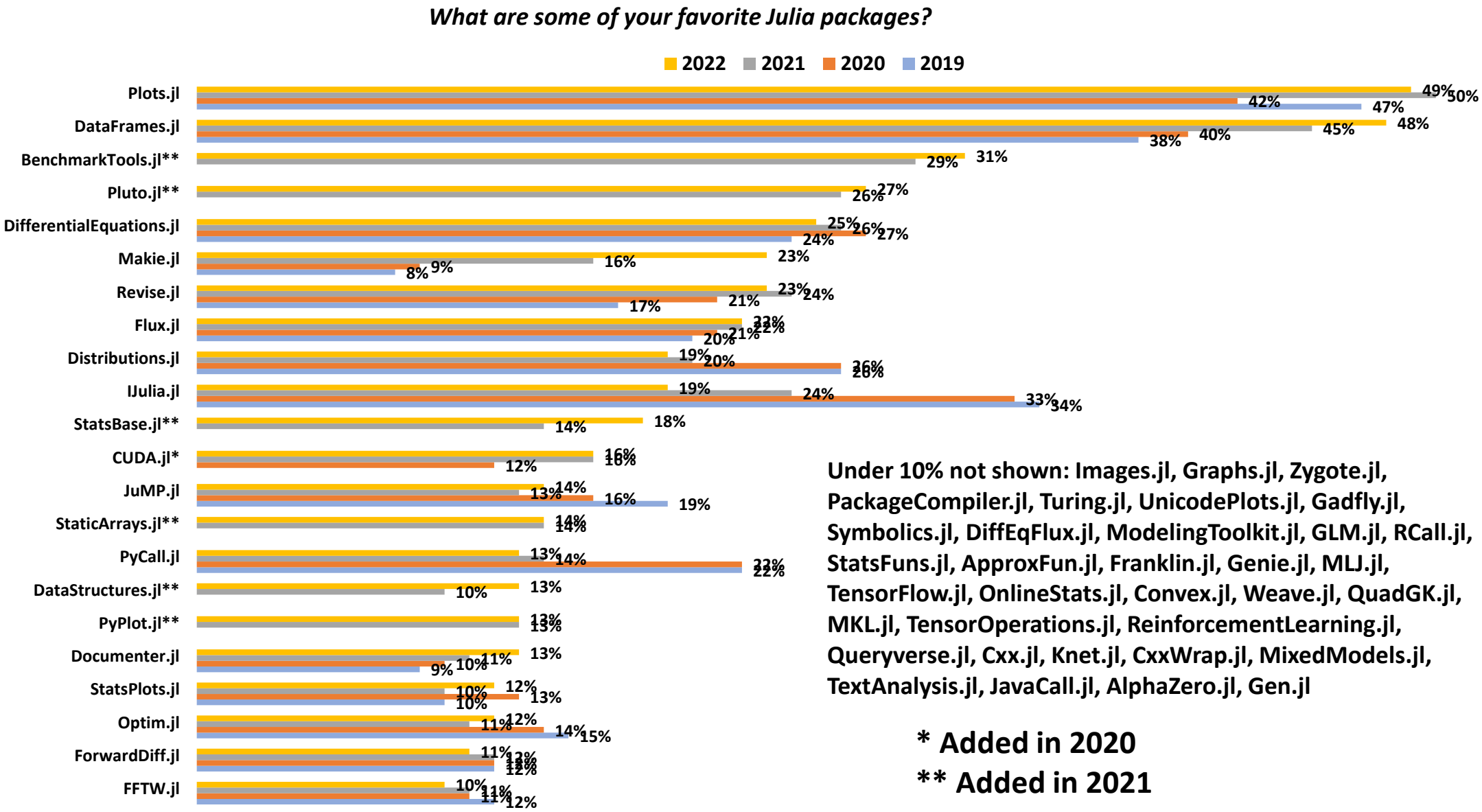
Most Julia Users & Developers Do At Least 20% of Their Programming Work in Julia

What percentage of the programming work you do is in Julia?



Julia computing

Most Popular Packages: Plots, DataFrames, BenchmarkTools, Pluto, DifferentialEquations, Makie, Revise, Flux, Distributions, IJulia, StatsBase, CUDA



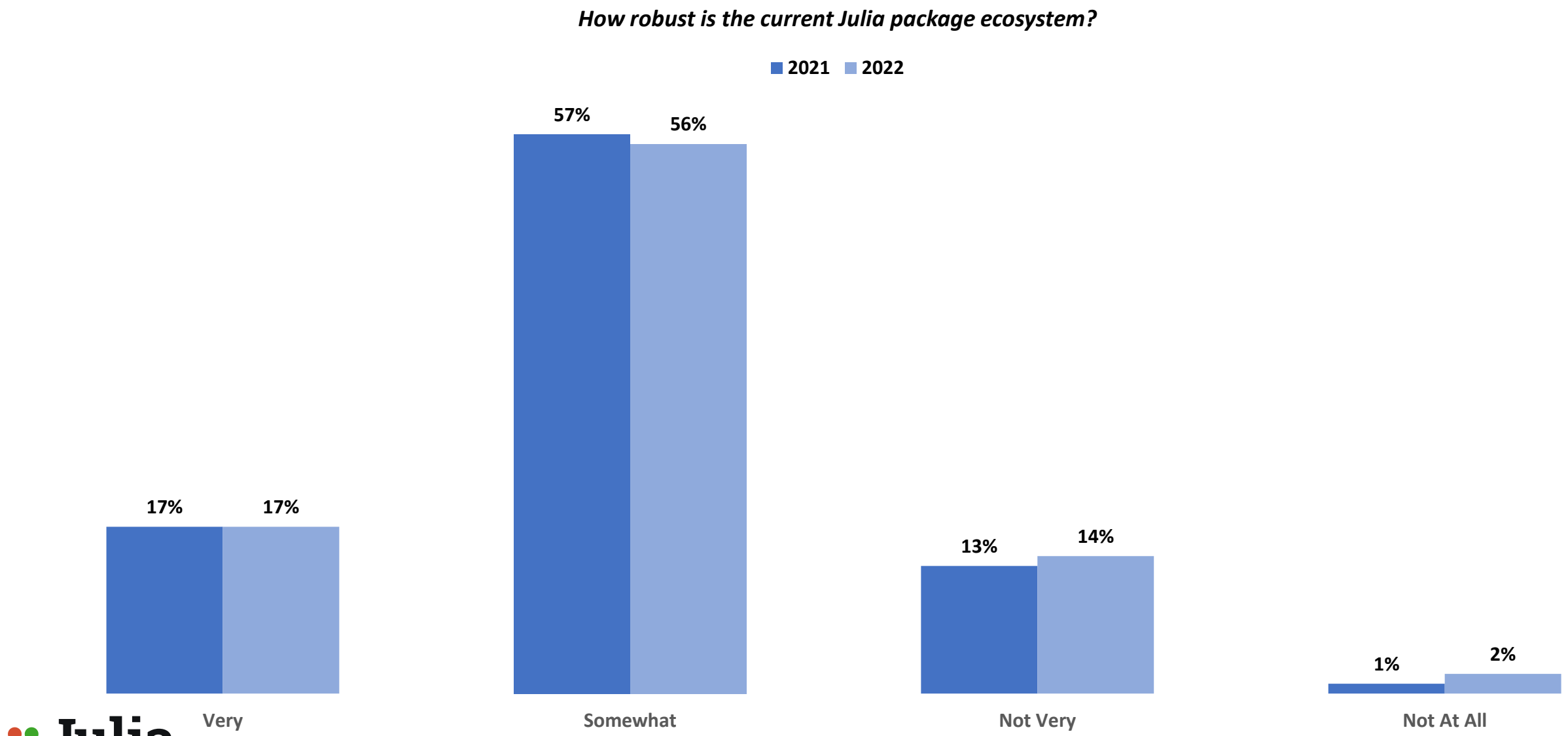
Under 10% not shown: Images.jl, Graphs.jl, Zygote.jl, PackageCompiler.jl, Turing.jl, UnicodePlots.jl, Gadfly.jl, Symbolics.jl, DiffEqFlux.jl, ModelingToolkit.jl, GLM.jl, RCall.jl, StatsFuns.jl, ApproxFun.jl, Franklin.jl, Genie.jl, MLJ.jl, TensorFlow.jl, OnlineStats.jl, Convex.jl, Weave.jl, QuadGK.jl, MKL.jl, TensorOperations.jl, ReinforcementLearning.jl, Queryverse.jl, Cxx.jl, Knet.jl, CxxWrap.jl, MixedModels.jl, TextAnalysis.jl, JavaCall.jl, AlphaZero.jl, Gen.jl

* Added in 2020

** Added in 2021

Julia computing

Most Say the Julia Package Ecosystem is ‘Somewhat’ Robust



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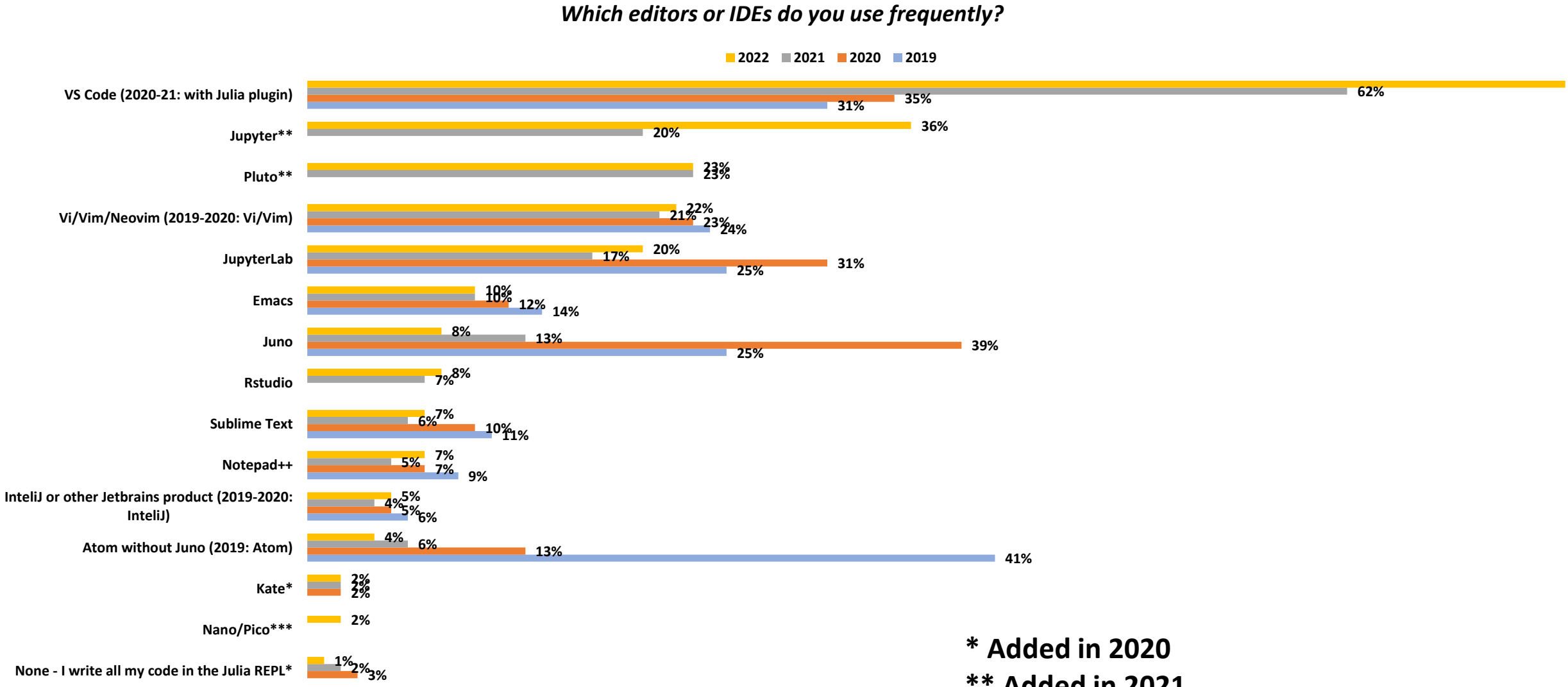
VS Code and Jupyter Are the Leading Editors or IDEs for Julia Users & Developers



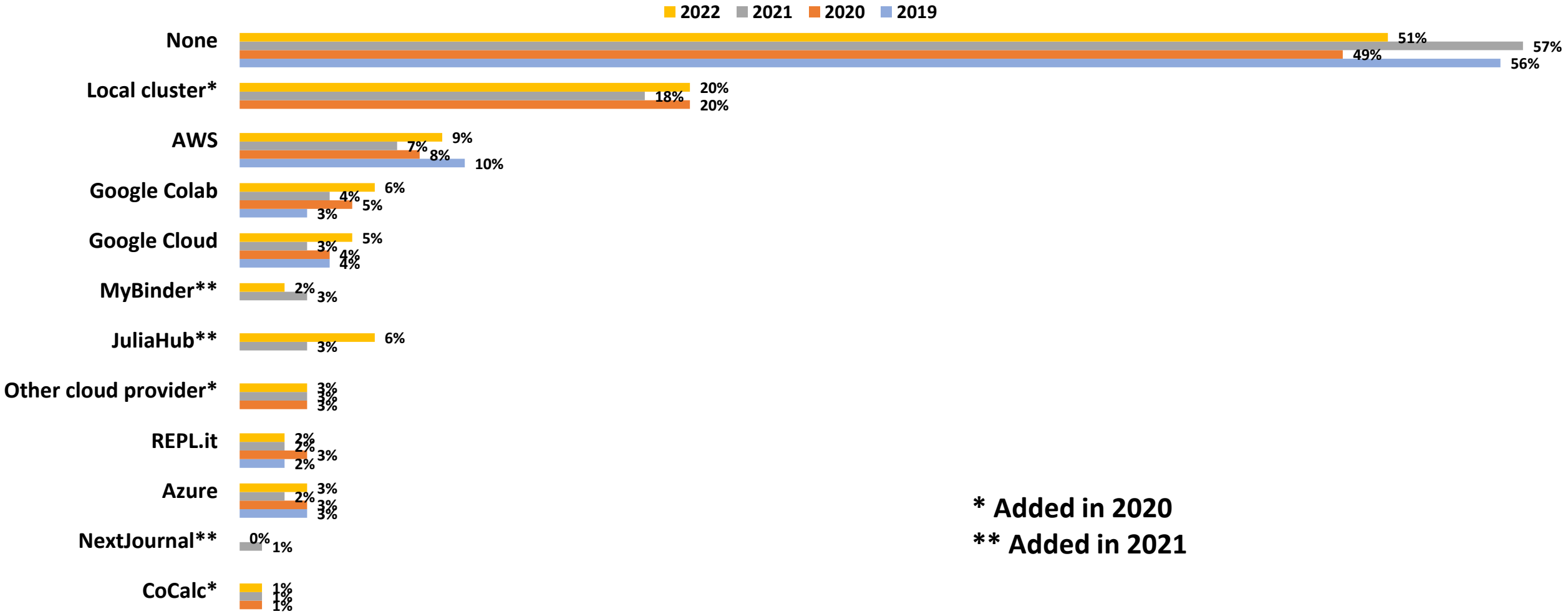
*** Added in 2020**

**** Added in 2021**

Julia computing

Most Use a Local Cluster or No Cloud Solution

Which cloud solutions, if any, do you use together with Julia?



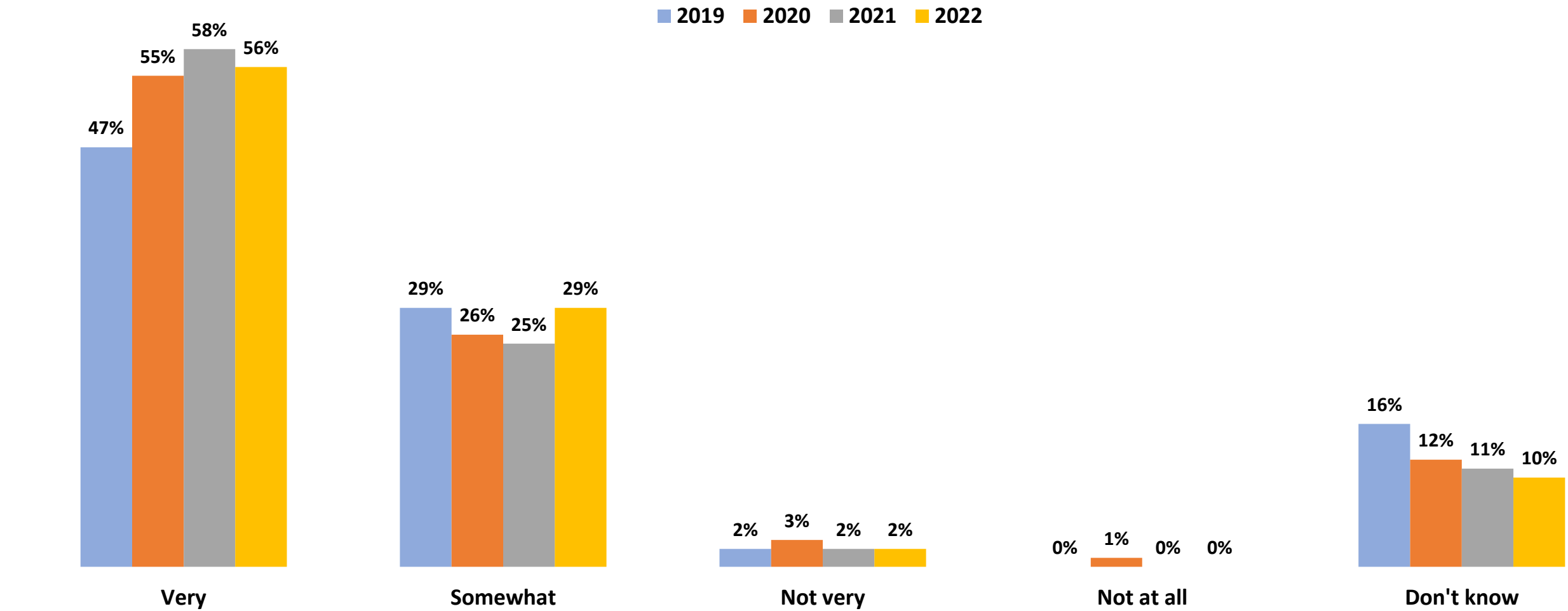
* Added in 2020

** Added in 2021

Julia computing

Most Say the Julia Community Is Very Helpful and Collaborative

How helpful and collaborative is the Julia community?

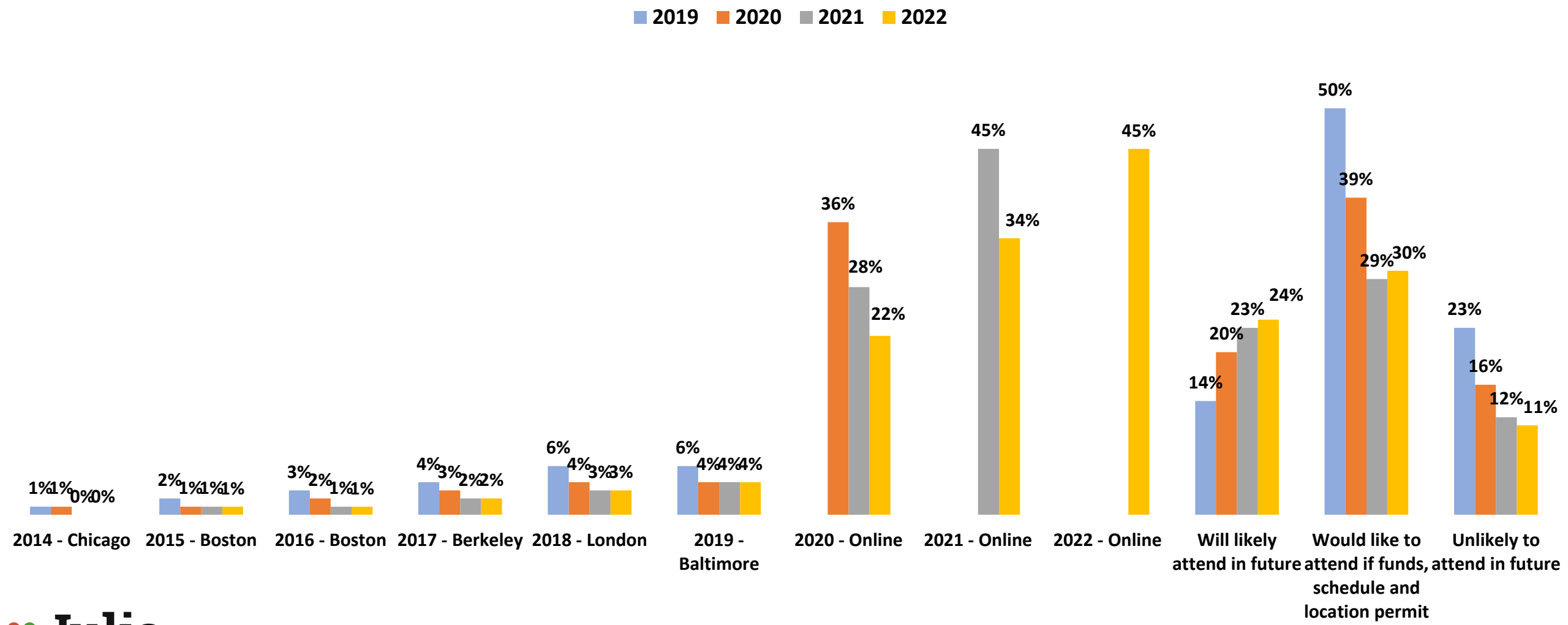


Julia computing

JuliaCon Growth Continues

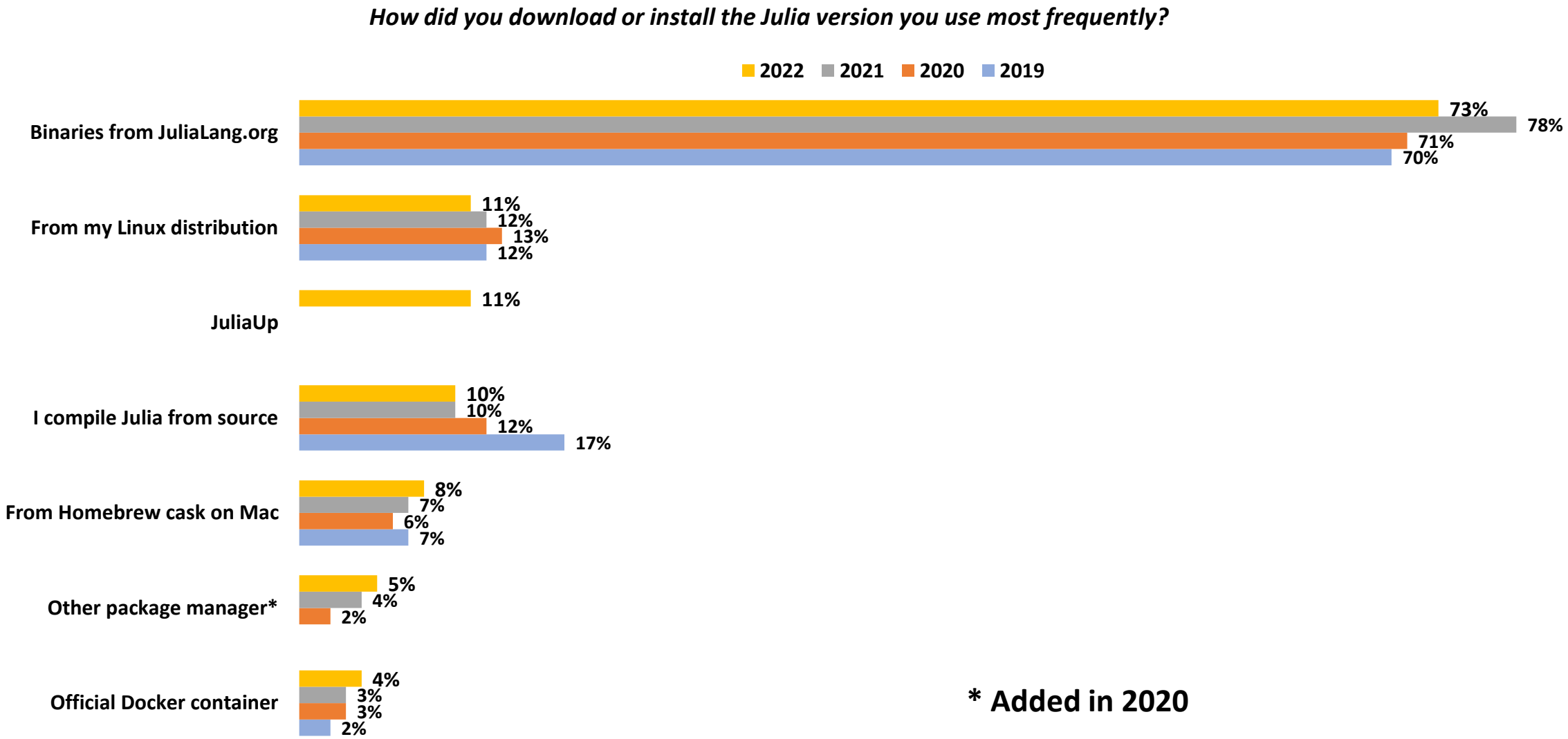
Virtual Conferences from 2020-2022 Have Made JuliaCon Much More Accessible

Have you attended or do you plan to attend JuliaCon? Please select all that apply.



Julia computing

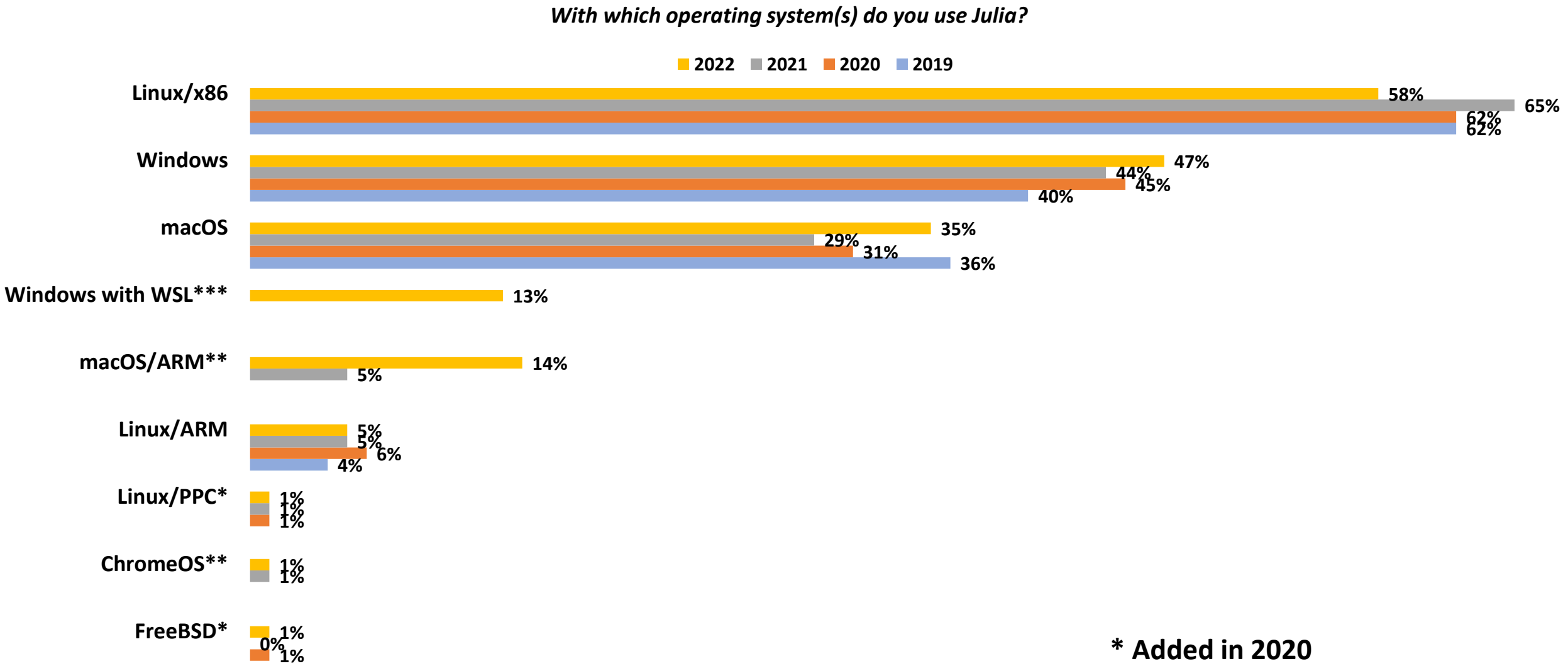
Most Downloaded or Installed Binaries from JuliaLang.org



* Added in 2020

Julia computing

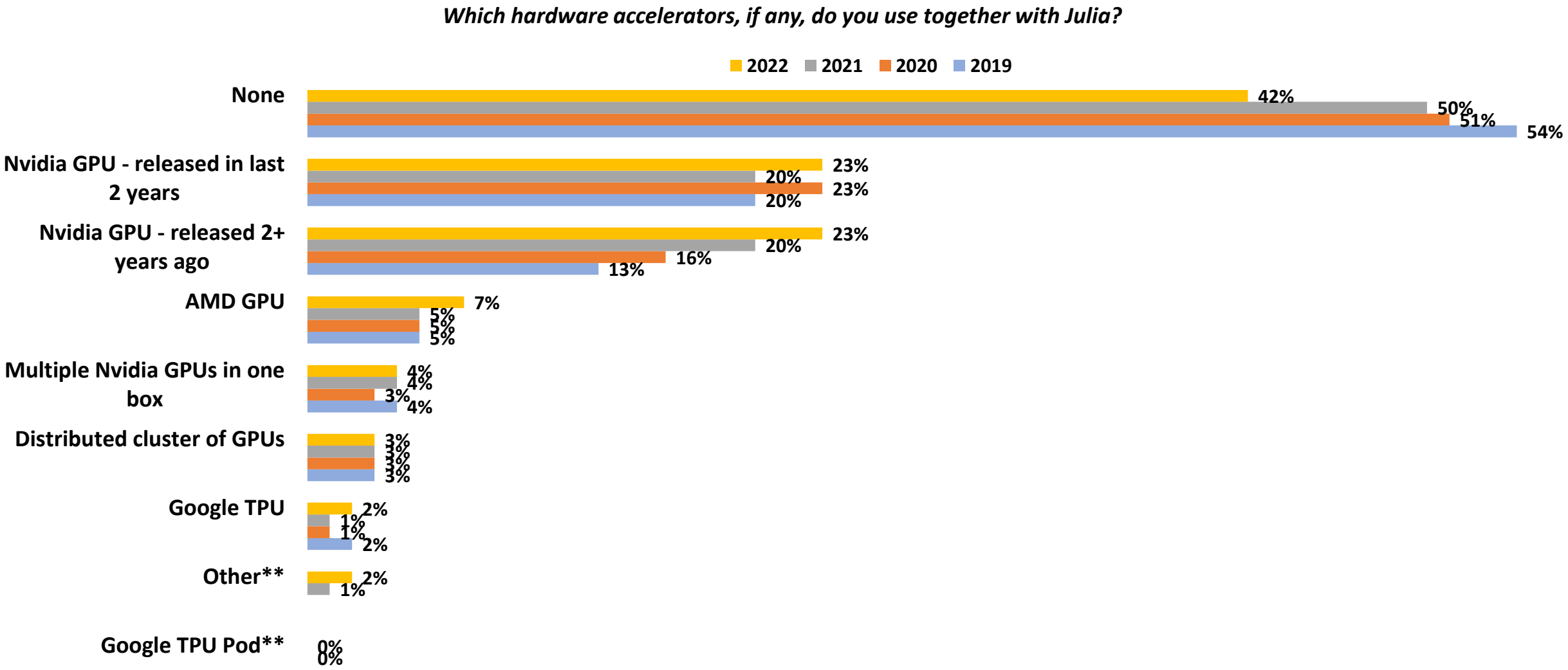
Most Still Use Julia with Linux/x86, but Windows and macOS Are Growing



* Added in 2020
** Added in 2021
*** Added in 2022

Julia computing

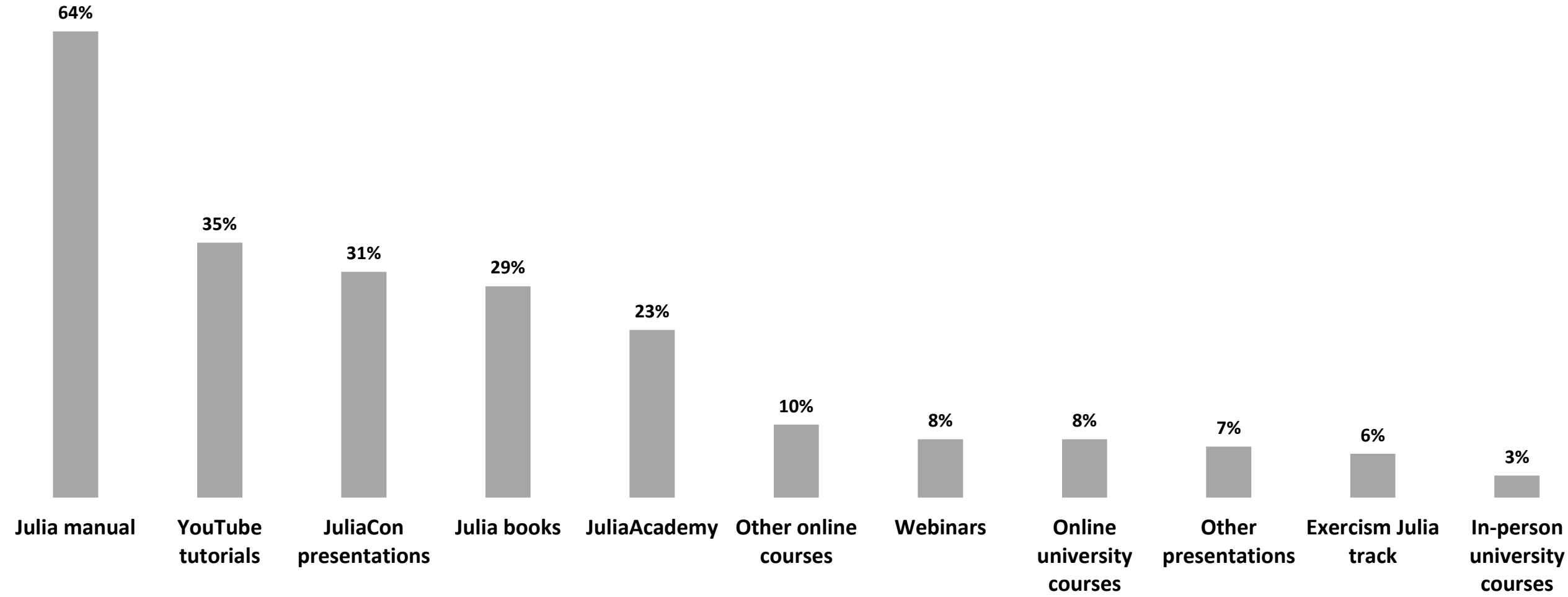
Most Julia Users Now Use Hardware Accelerators
Nvidia GPUs Remain Most Common



Julia computing

Julia Manual Is Most Useful, Followed by YouTube, JuliaCon, Julia Books and JuliaAcademy

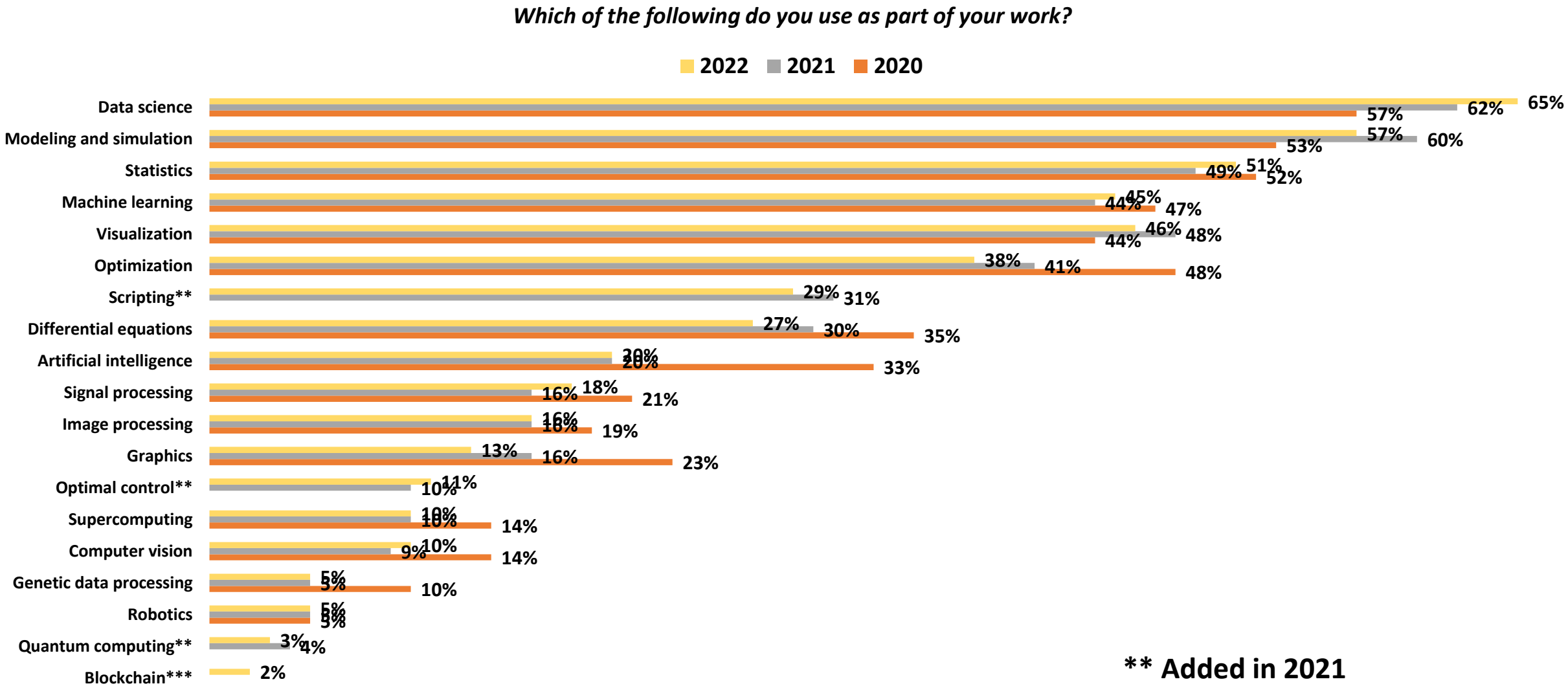
What resources have you found most useful when learning Julia for the first time or when learning how to do something in Julia? Please select all that apply.



Julia computing

Most Respondents Use Data Science, Modeling and Simulation and Statistics as Part of their Work

Machine Learning, Visualization, Optimization, Scripting, Differential Equations and Artificial Intelligence Are Also Used by Many



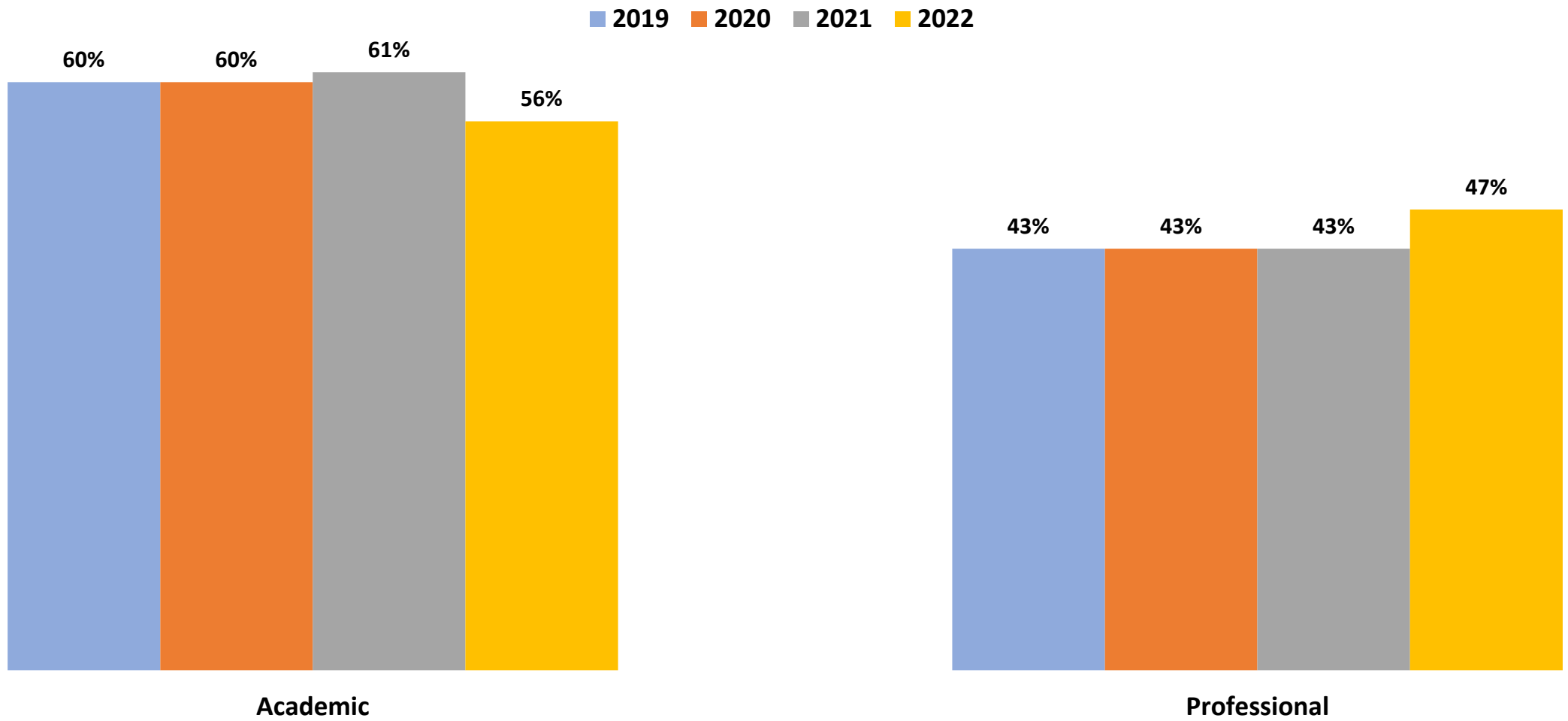
** Added in 2021

*** Added in 2022

Julia computing

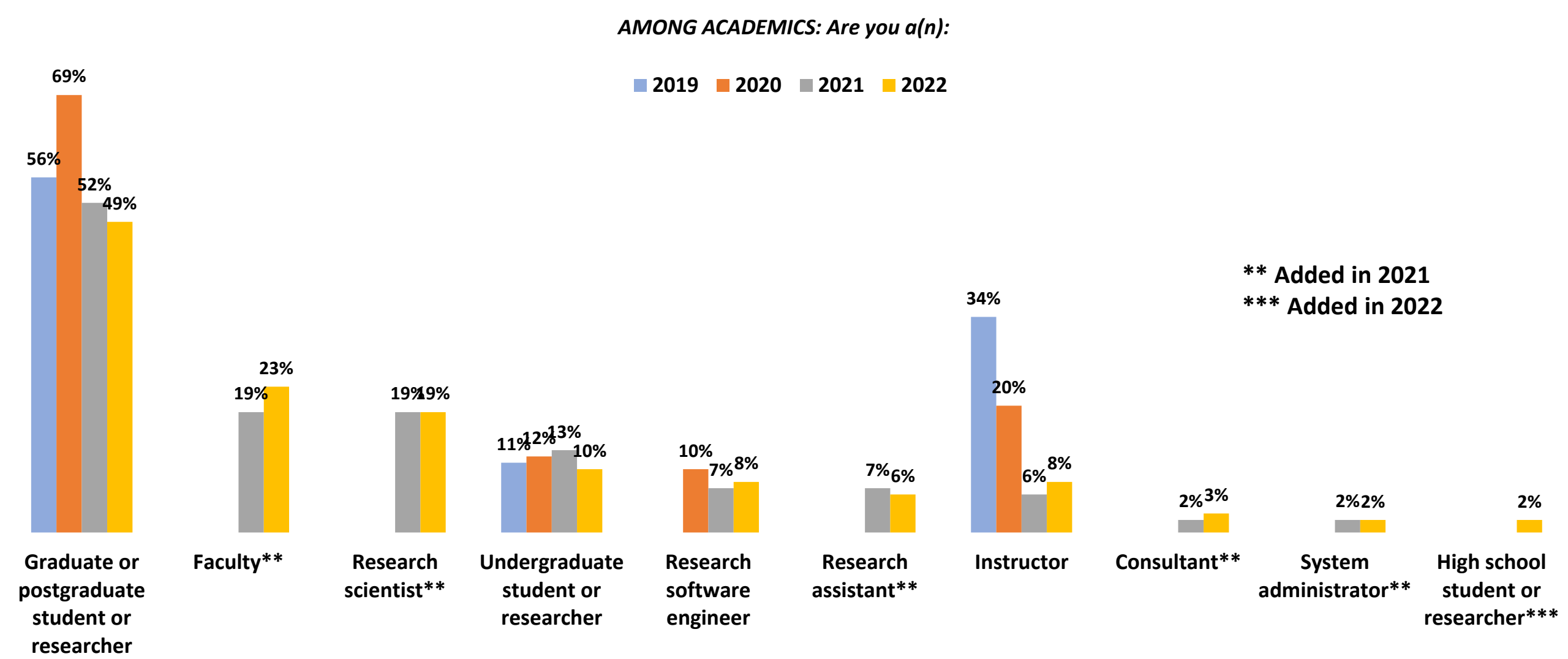
Professionals Are Becoming a Larger Share of Julia Users & Developers

Which of the following best describes you? Please select all that apply.

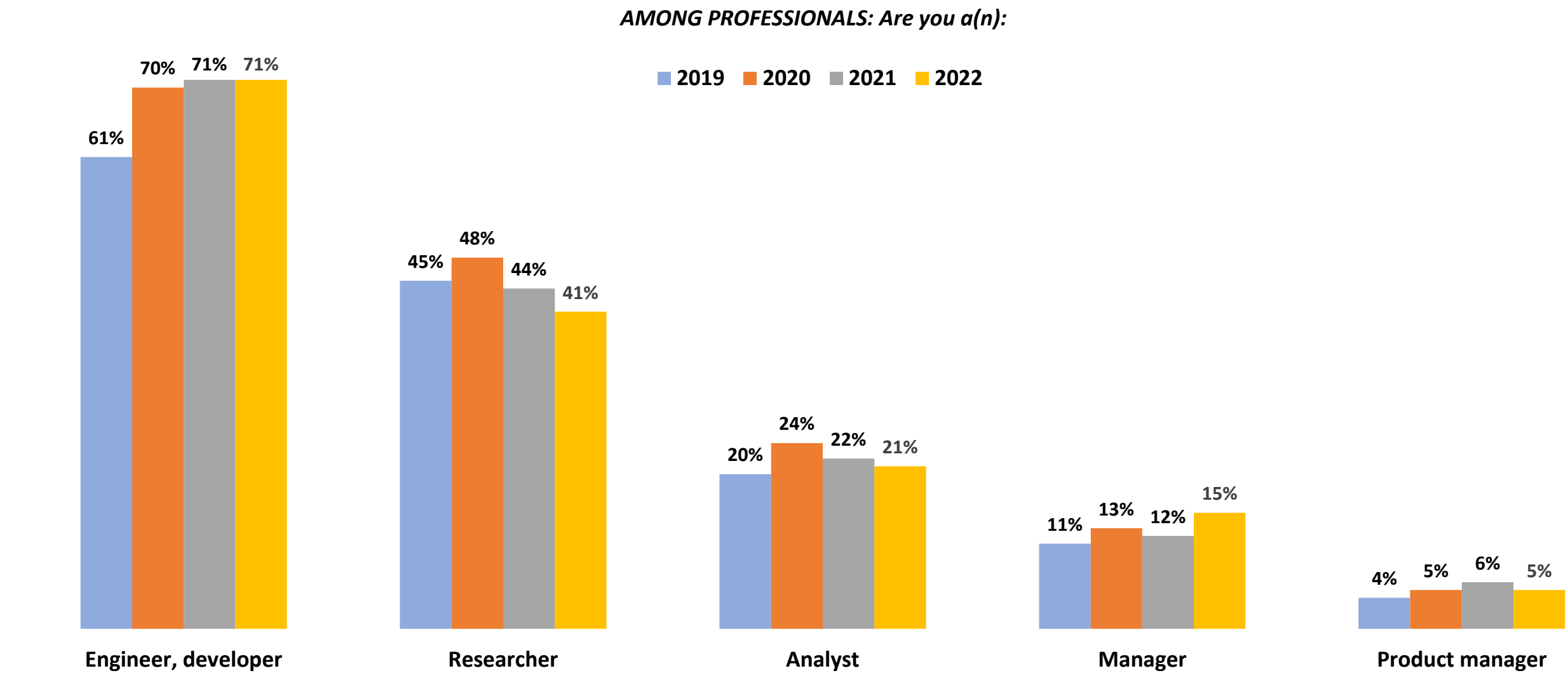


Julia computing

Among Academics, Most Respondents Are Graduate or Postgraduate Students or Researchers

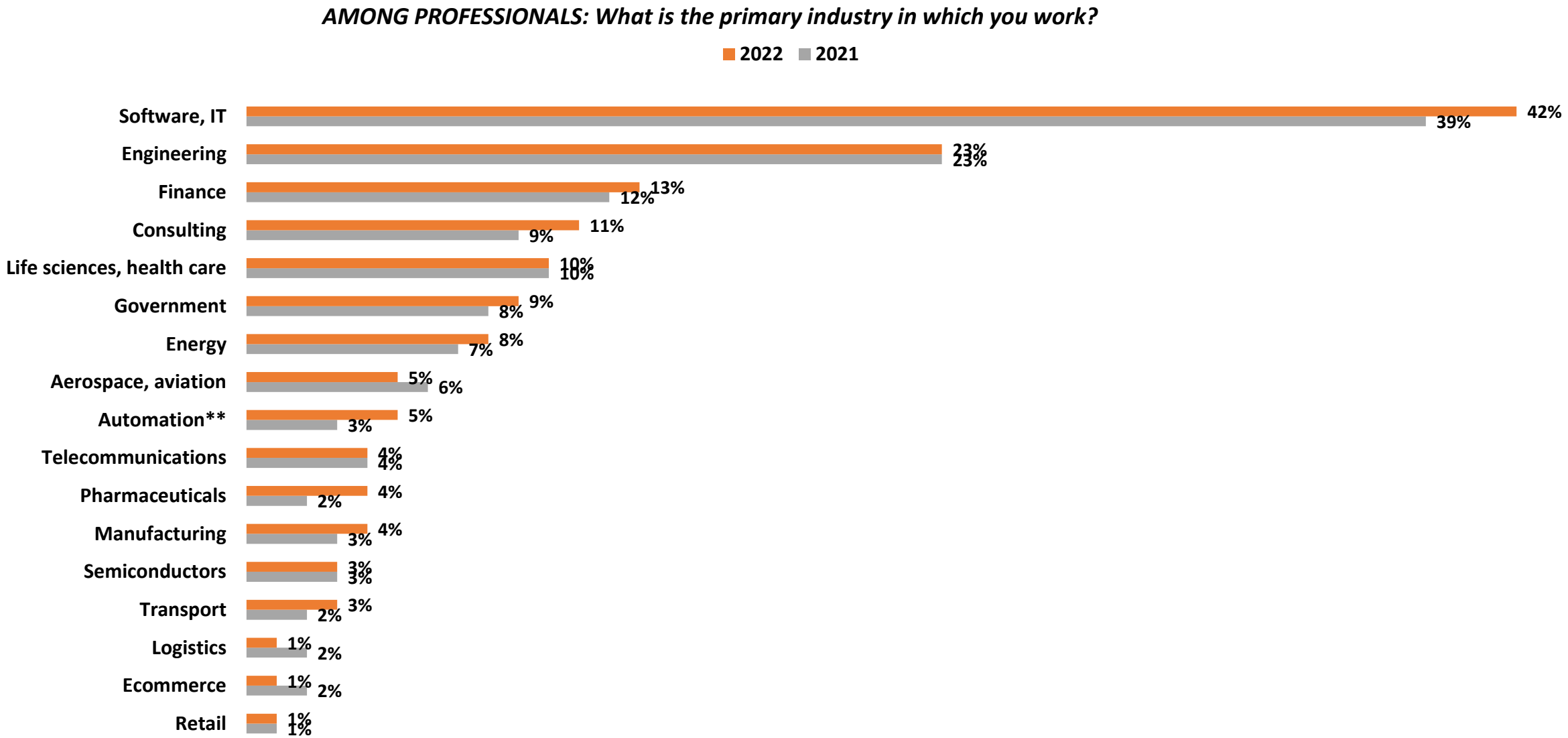


Among Professionals, Most Respondents Are Engineers or Developers



Julia computing

Among Professionals, the Most Common Industries Include Software, IT and Engineering



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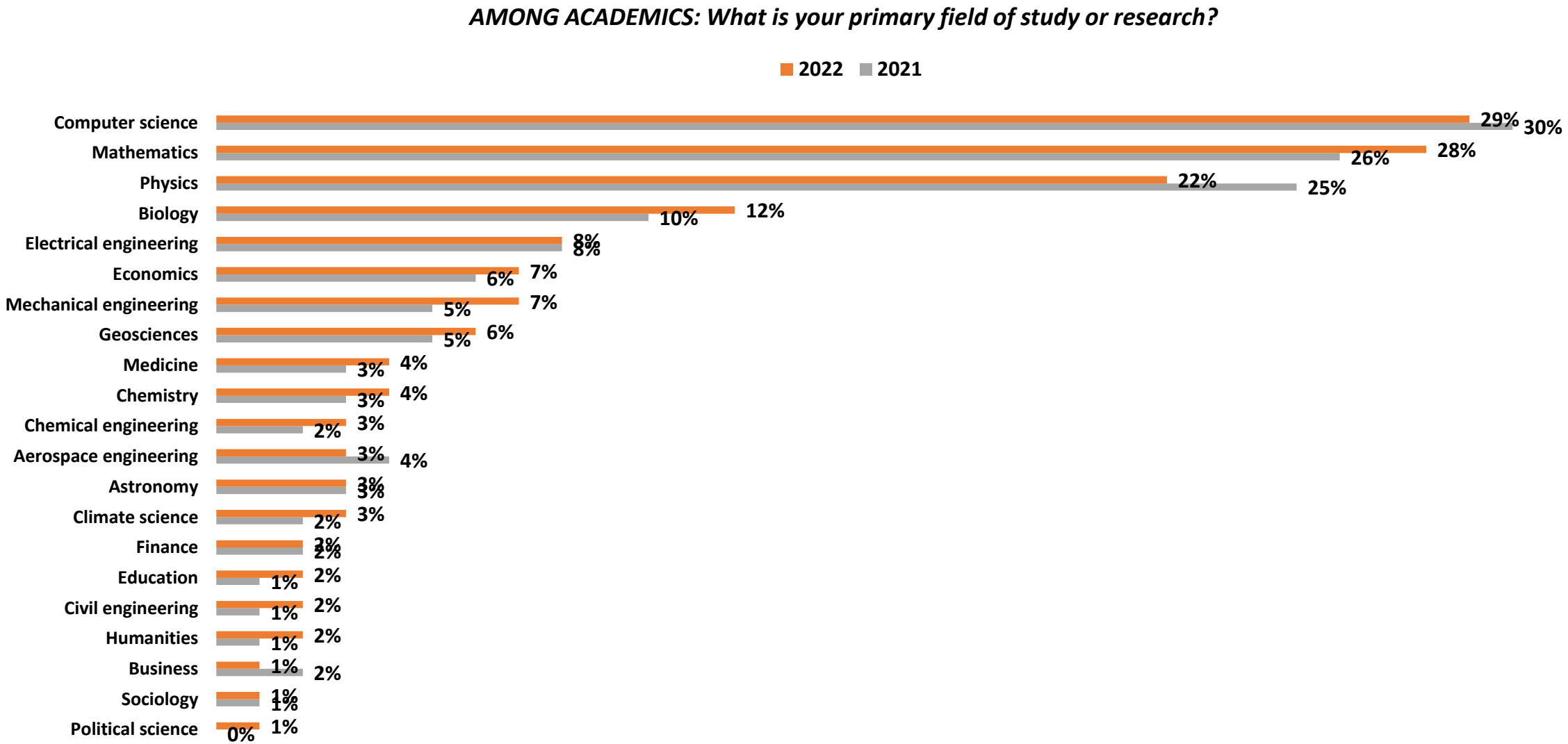
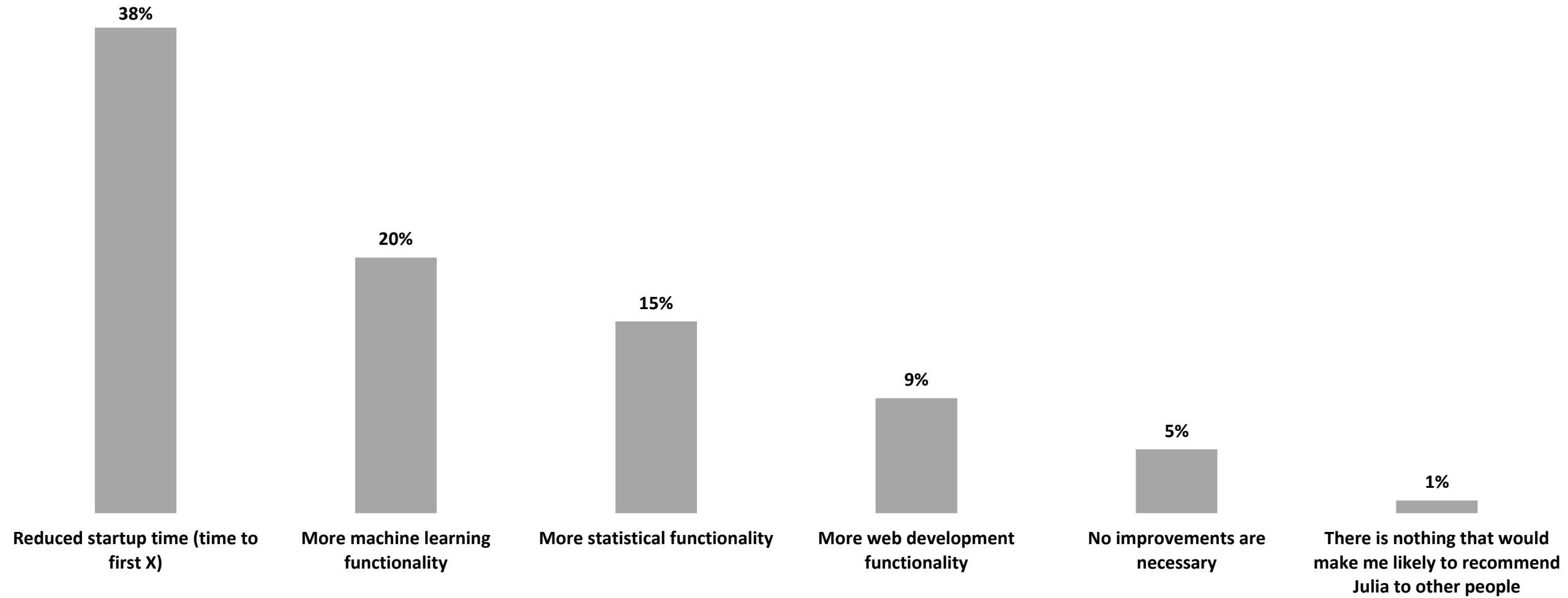
Among Academics, the Most Common Fields Are Computer Science, Mathematics, Physics and Biology



Julia computing

Julia Users Would Be More Likely to Recommend Julia if Startup Time Is Reduced

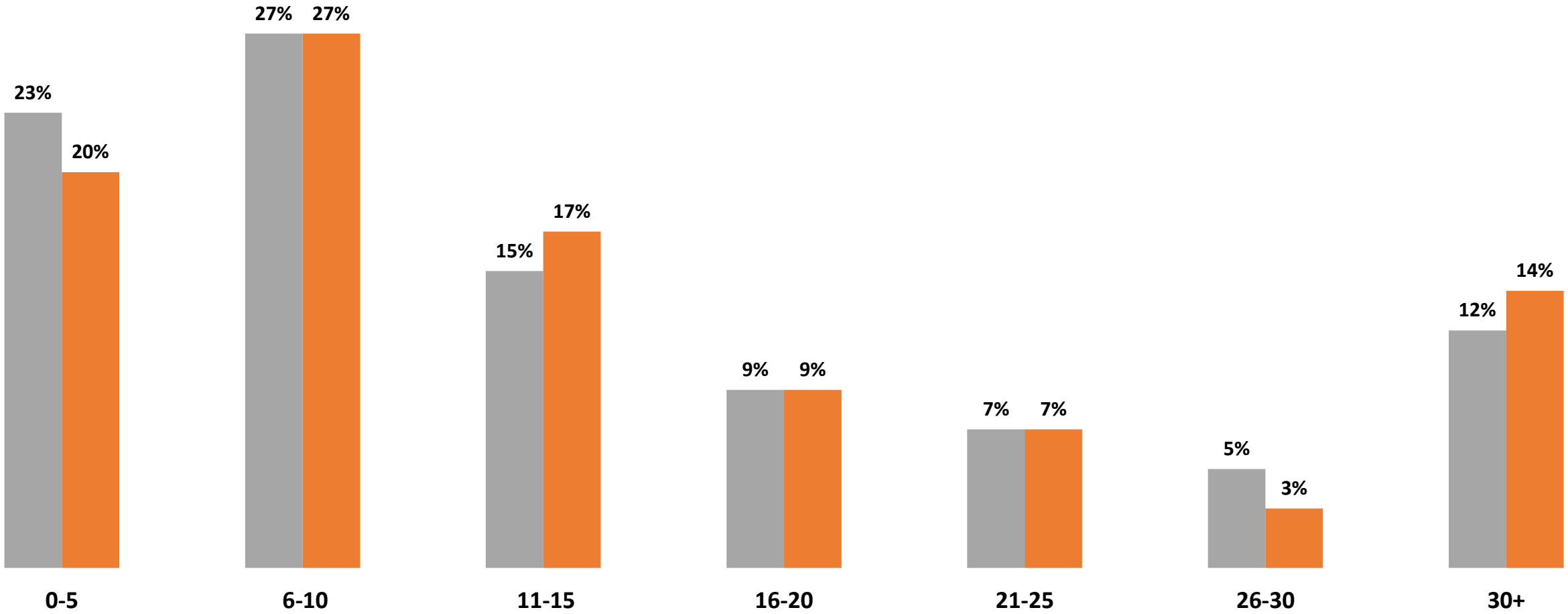
What type of improvements to Julia would make you more likely to recommend Julia to other people?



Julia computing

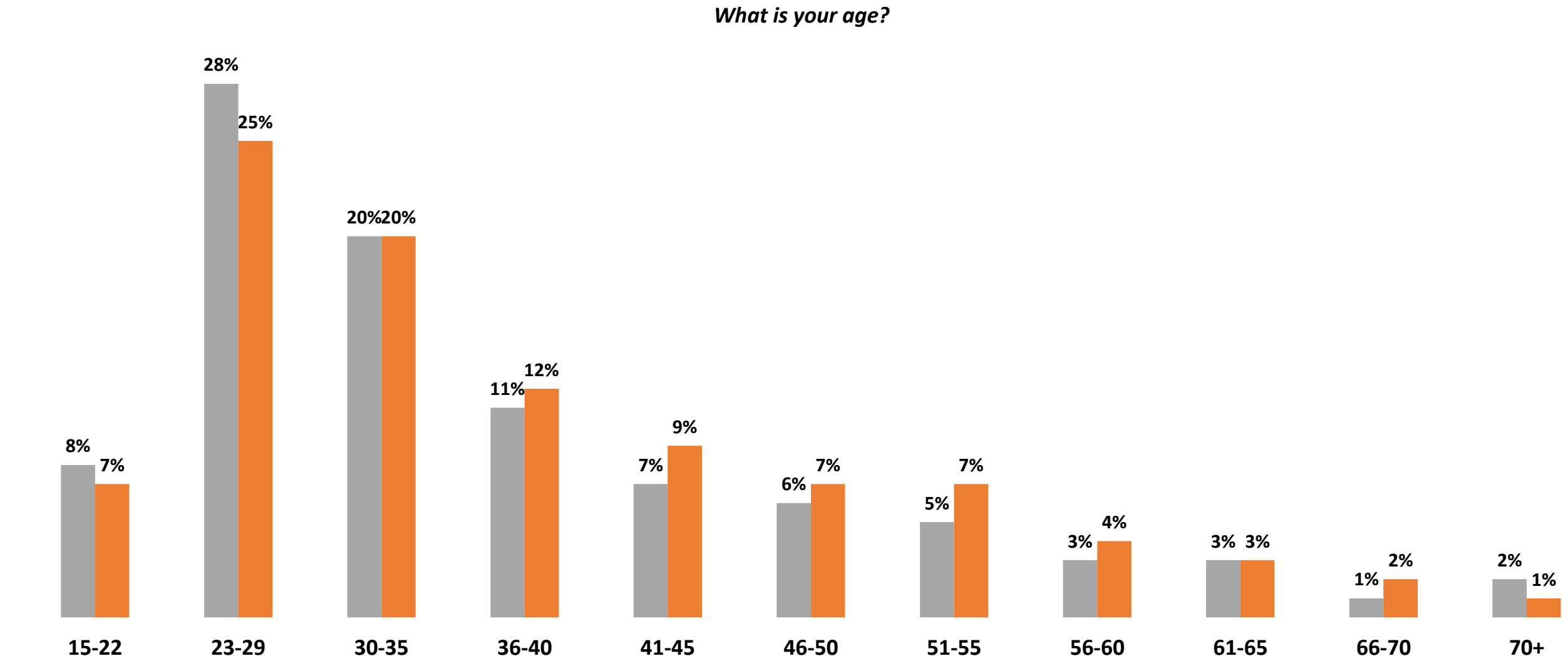
Most Julia Users & Developers Have 15 Years Coding Experience or Less

How many years of coding experience do you have?



Julia computing

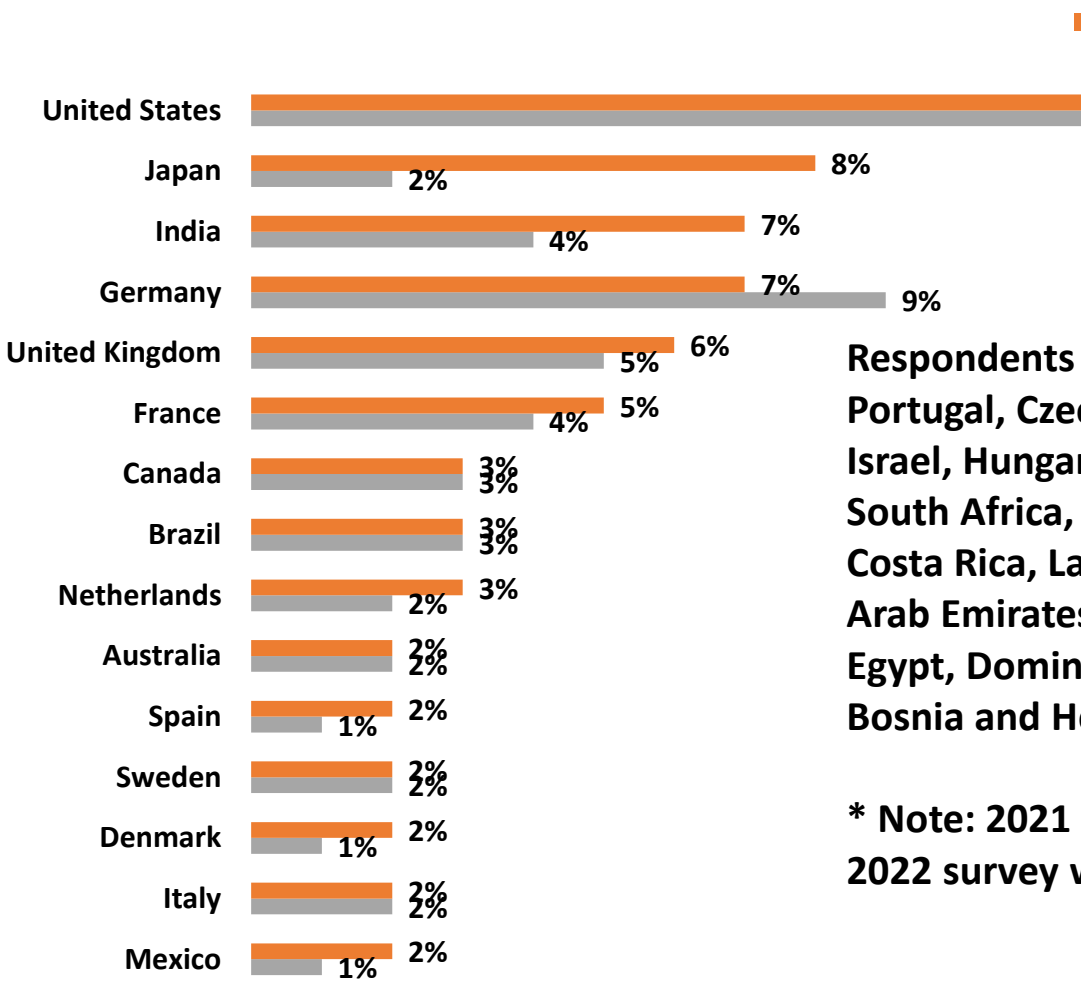
Most Julia Users and Developers Are Age 23-40
The Number of Julia Users and Developers Age 36+ Is Growing



Julia computing

Respondents Live or Work in Over 75 Countries and Regions
Japan and India Show Most Growth

What is the country or region where you currently live or work?



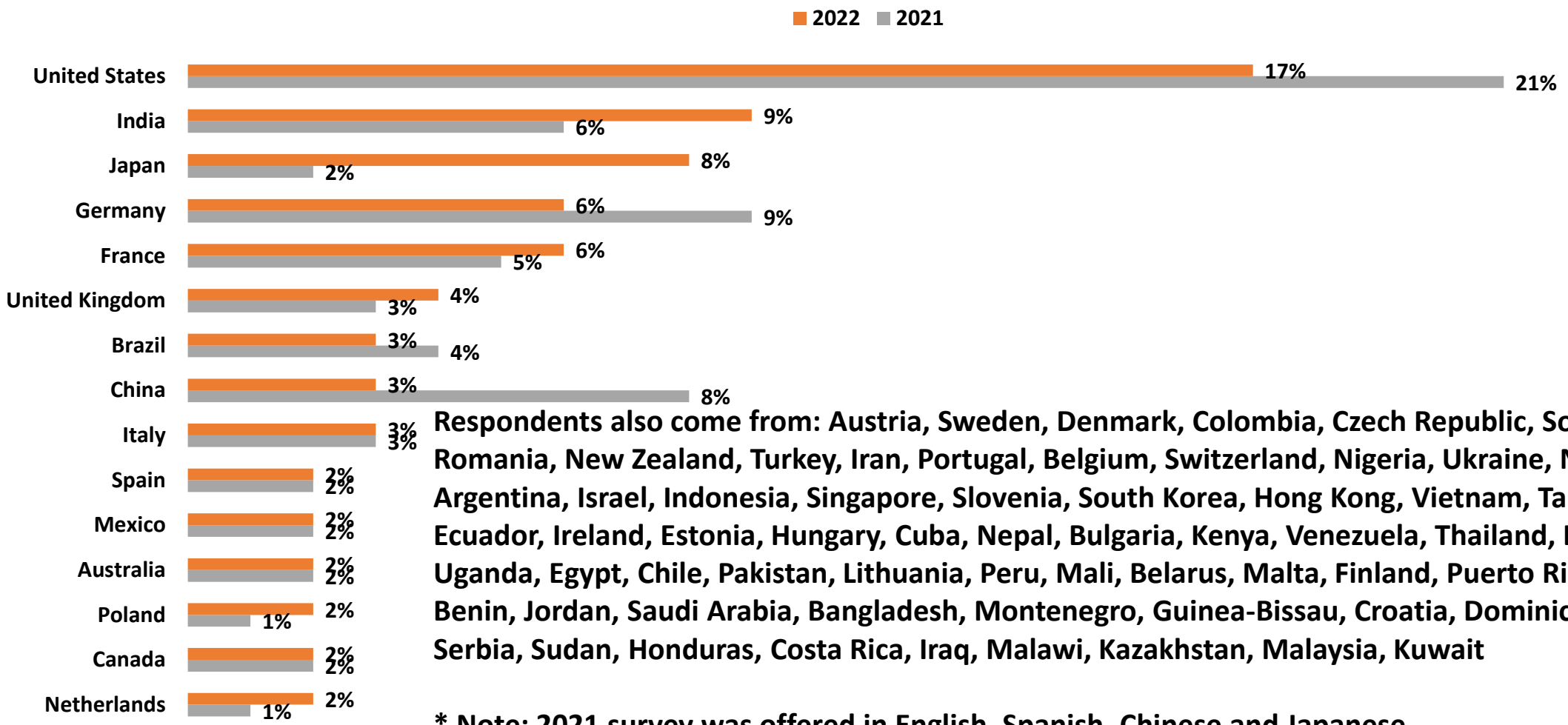
Respondents also live or work in: Switzerland, Poland, China*, New Zealand, Austria, Portugal, Czech Republic, Norway, Romania, Singapore, Turkey, Colombia, Argentina, Israel, Hungary, Indonesia, Russia, Belgium, Nigeria, Greece, South Korea, Ukraine, South Africa, Hong Kong, Finland, Nepal, Ireland, Estonia, Chile, Taiwan, Slovenia, Malta, Costa Rica, Latvia, Ecuador, Vietnam, Philippines, Saudi Arabia, Thailand, Kuwait, United Arab Emirates, Iran, Lithuania, Iraq, Uganda, Croatia, Honduras, Cuba, Bolivia, Armenia, Egypt, Dominican Republic, Peru, Belarus, Madagascar, Namibia, Bangladesh, Comoros, Bosnia and Herzegovina, Senegal, Luxembourg, Kenya

*** Note: 2021 survey was offered in English, Spanish, Chinese and Japanese**
2022 survey was offered only in English, Spanish and Japanese

Julia computing

Respondents Come from 84 Countries and Regions
India and Japan Show Most Growth

What is the country or region where you are originally from?



Respondents also come from: Austria, Sweden, Denmark, Colombia, Czech Republic, South Africa, Greece, Romania, New Zealand, Turkey, Iran, Portugal, Belgium, Switzerland, Nigeria, Ukraine, Norway, Russia, Argentina, Israel, Indonesia, Singapore, Slovenia, South Korea, Hong Kong, Vietnam, Taiwan, Philippines, Ecuador, Ireland, Estonia, Hungary, Cuba, Nepal, Bulgaria, Kenya, Venezuela, Thailand, Latvia, Bolivia, Uganda, Egypt, Chile, Pakistan, Lithuania, Peru, Mali, Belarus, Malta, Finland, Puerto Rico, Slovakia, Benin, Jordan, Saudi Arabia, Bangladesh, Montenegro, Guinea-Bissau, Croatia, Dominican Republic, Serbia, Sudan, Honduras, Costa Rica, Iraq, Malawi, Kazakhstan, Malaysia, Kuwait

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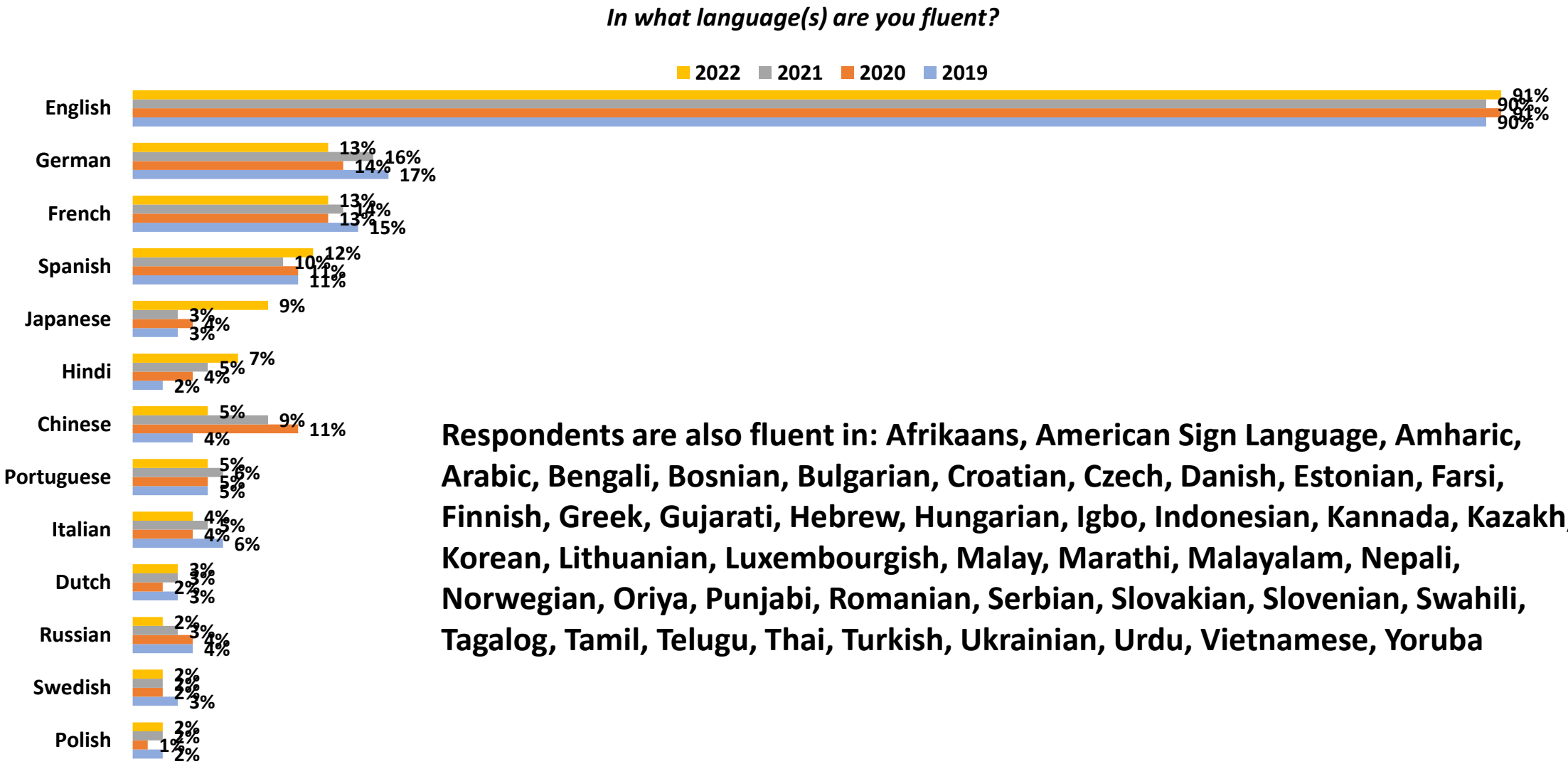
2022 survey was offered only in English, Spanish and Japanese

Julia computing

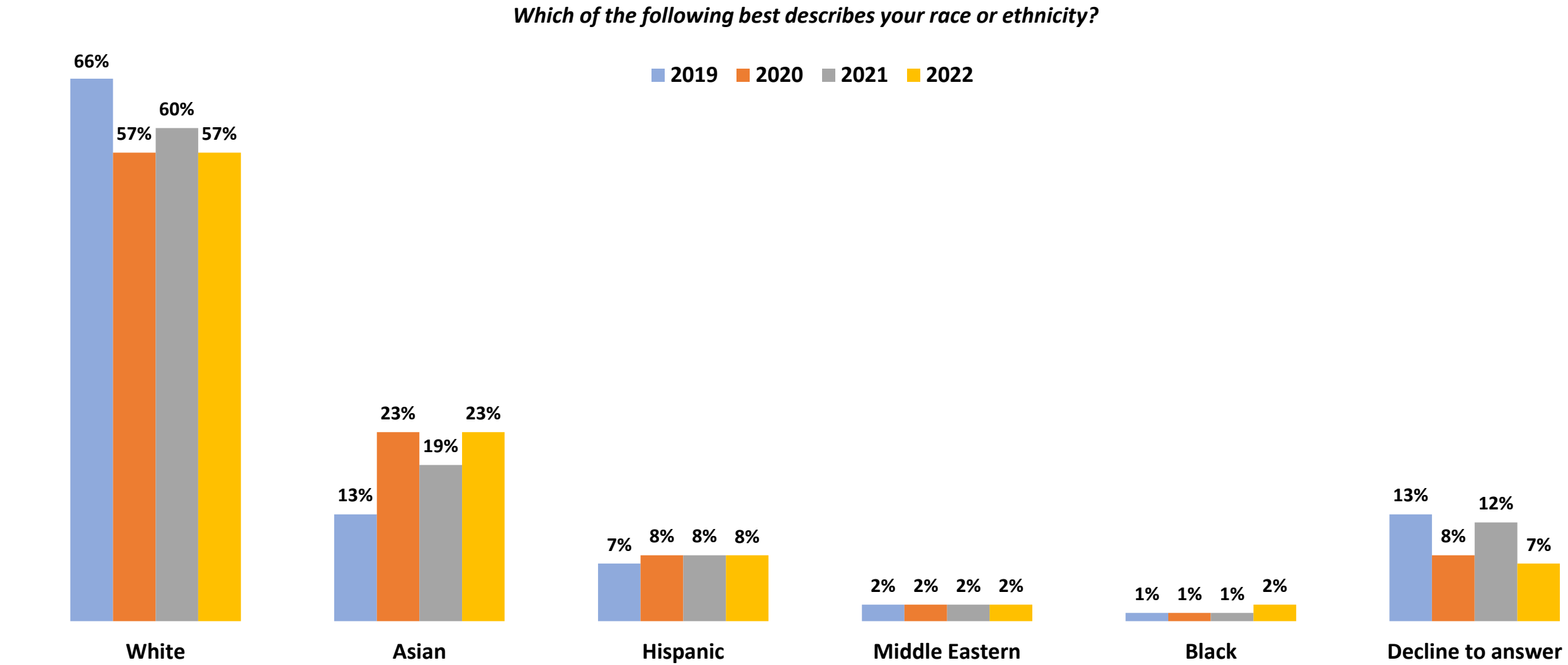
Respondents Are Fluent in 58 Languages



Respondents are also fluent in: Afrikaans, American Sign Language, Amharic, Arabic, Bengali, Bosnian, Bulgarian, Croatian, Czech, Danish, Estonian, Farsi, Finnish, Greek, Gujarati, Hebrew, Hungarian, Igbo, Indonesian, Kannada, Kazakh, Korean, Lithuanian, Luxembourgish, Malay, Marathi, Malayalam, Nepali, Norwegian, Oriya, Punjabi, Romanian, Serbian, Slovakian, Slovenian, Swahili, Tagalog, Tamil, Telugu, Thai, Turkish, Ukrainian, Urdu, Vietnamese, Yoruba

Julia computing

Most Respondents Are White or Asian



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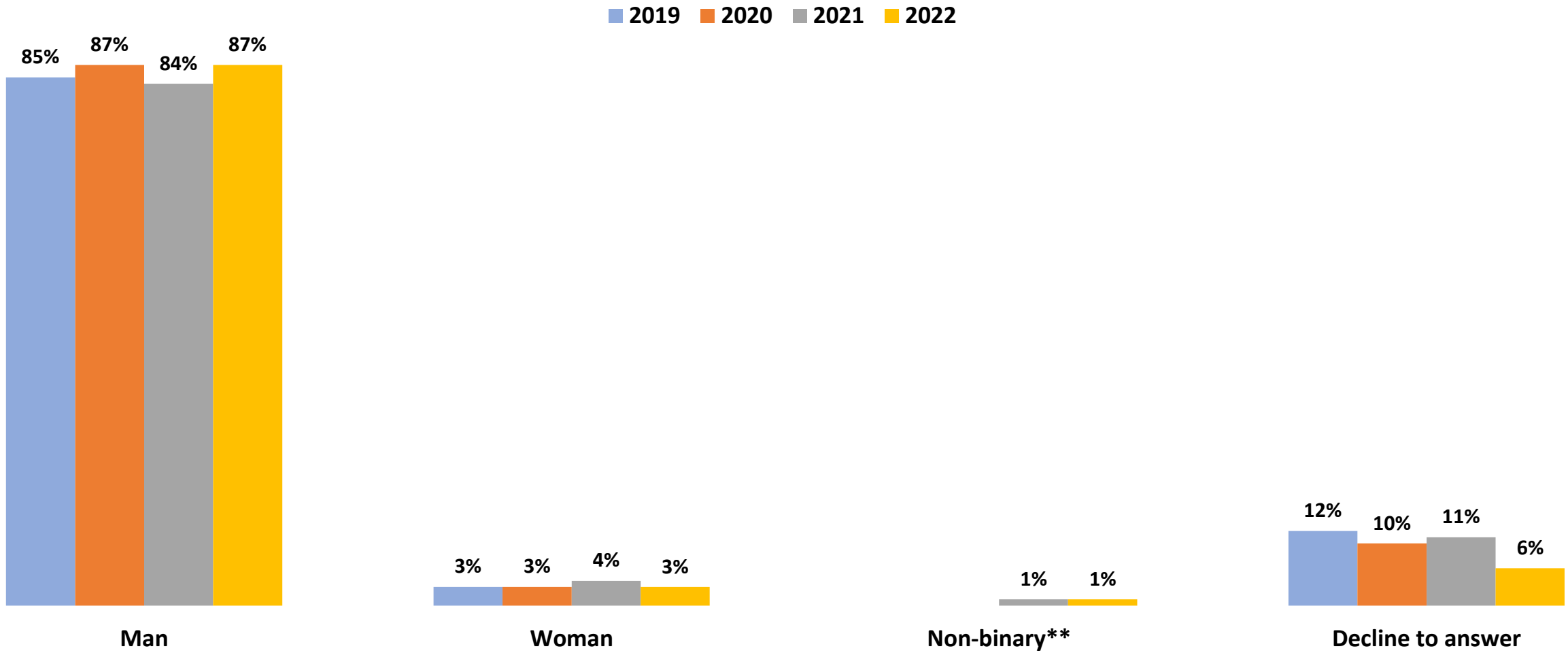
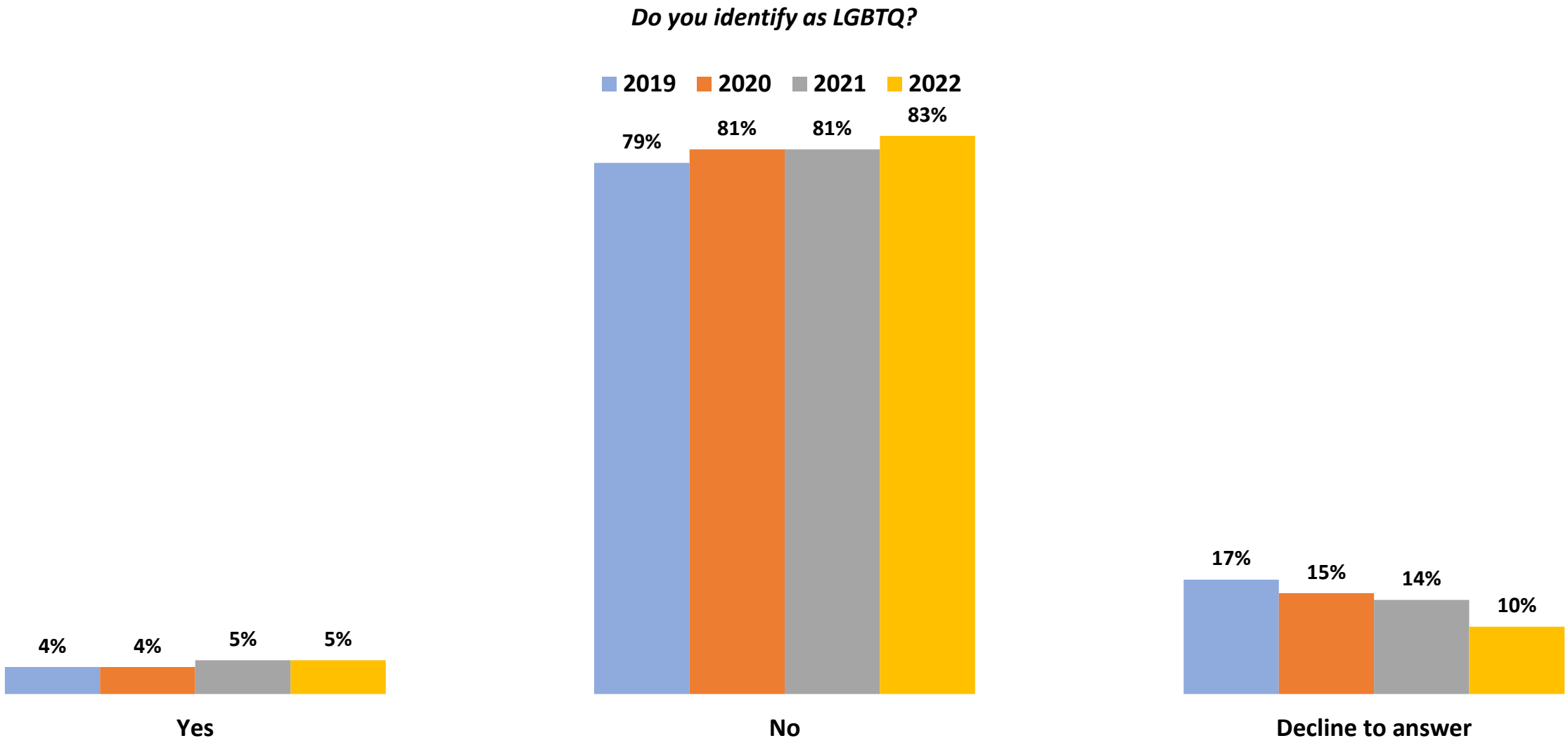
87% Identify as Men, 3% Identify as Women, 1% as Non-Binary and 6% Decline to Answer

Which of the following best describes how you identify?



** Added in 2021

5% Identify as LGBTQ



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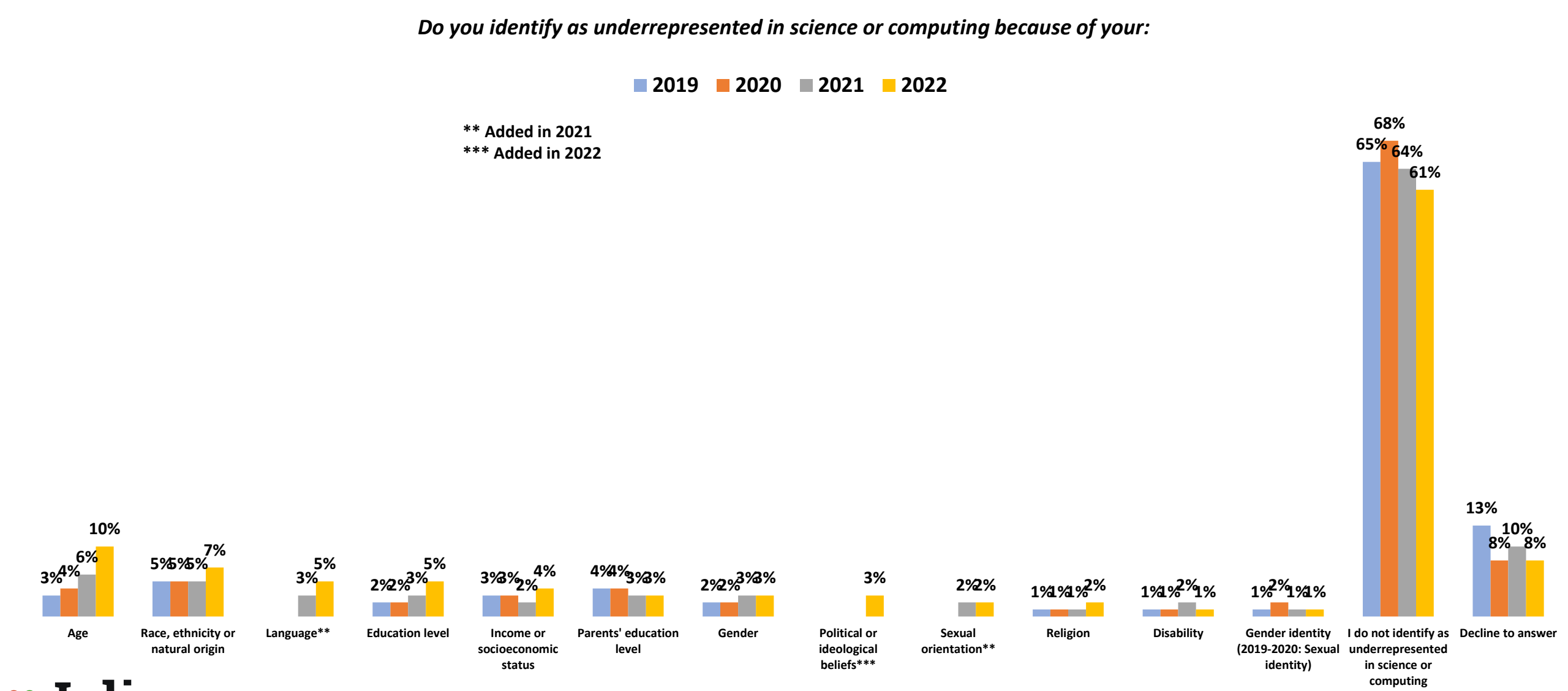
31% Identify as Underrepresented in Science or Computing – 10% Due to Age



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Contact

Andrew.Claster@juliacomputing.com

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